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JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

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THE SIXTY-NINTH ANNUAL CONVENTION OF THE AMERICAN PHARMACEUTICAL ASSOCIATION WILL BE HELD IN NEW ORLEANS, LA., DURING WEEK OF SEPTEMBER 5, 1921

The 1921 meetings of the American Conference of Pharmaceutical Faculties and the National Association of Boards of Pharmacy will also be held in New Orleans during Convention Week

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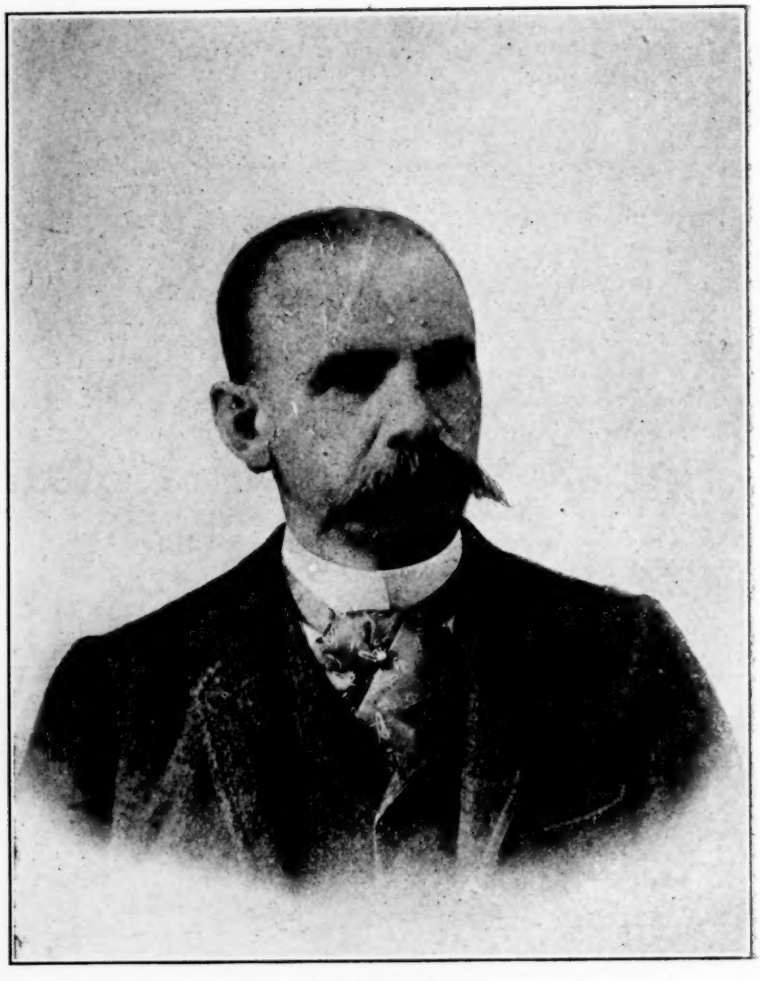
NEW ORLEANS, LA.

President of American Pharmaceutical Association 1891–1892



A. K. FINLAY.

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL. X AUGUST 1921 NO. 8

ALEXANDER KIRKWOOD FINLAY.

Alexander K. Finlay, thirty-ninth president of the American Pharmaceutical Association, was a native of Ireland, but for many years was a resident of New Orleans, La. This brief sketch has been prepared from data supplied by our fellow-member, F. C. Godbold. Mr. Finlay succeeded his brother, J. K. Finlay, at the corner of Camp and Julia Streets, about 1870; although this location was at that period far away from the business section of New Orleans, the Finlays made this store the center of New Orleans' prescription trade; customers came from all sections of the city to have prescriptions compounded and the pharmacy found favor with physicians; later another store was opened in the Medical Building on Baronne Street.

Mr. Finlay was active in efforts that had to do with the betterment of the profession. He was a member of the first Louisiana Board of Pharmacy, was its president for several years and served as a member from 1888 to 1893. He was one of the organizers of the Louisiana Pharmaceutical Association and its first vice-president in 1882; during the year of 1885–1886, he served as president. He assisted in the organization of the National Association of Retail Druggists and, later, became a vice-president. He was a life member of the American Pharmaceutical Association, having joined in 1885, and presided over the meeting held at Profile House, N. H., in 1892, having been elected president at the New Orleans Convention, in 1891.

Mr. Finlay retired from active business in 1901; he died October 20, 1911, aged sixty-eight years.

EDITORIAL

E. G. EBERLE, Editor 253 Bourse Bldg., PHILADELPHIA

THE PROBLEMS OF PHARMACY.

ALL trades and professions have their problems, many of which also concern pharmacists, because of the interrelation of pharmacy. President E. Saville Peck, of the British Pharmaceutical Conference, in his annual address discusses British Pharmacy and its possibilities; his hopes are not so different from those that have been expressed by American pharmacists. He has given careful study to the organization of the American Pharmaceutical Association and the closely related bodies; his viewpoint is that of an eclectic, and his conclusions are reached and applications are made with a precognition that the practice of British and American pharmacy differs in some respects. It is very evident, however, that in England, as in the United States, there has been a desire and still a recognition of the difficulty to draw a distinct line between what is "commercial" pharmacy and what is professional; furthermore, neither here nor there is it generally admitted that the depreciation of pharmacy is entirely due to the fact that its practice is for the most part carried on "behind a counter" in "an open shop." President Peck does not differentiate between a trade and a profession nor does he contend that one is more worthy, desirable or honorable than the other. He states: "It can well be said that many so-called professional men carry on their profession in a purely commercial spirit, while many so-called tradesmen bring professional instincts to bear upon their business."

It is pleasing to note that many of the comments, suggestions and proposals of the address are not so very different from the plans which have been formulated by the American Pharmaceutical Association; some activated, others still in the formative period. We present several of the concluding paragraphs:

"Pharmacy, if it is to progress, will have to move forward with advance of general education and of applied science."

"If it is to take up its position with other professional bodies it must bring its final qualification up to University and Continental standards. If we cannot differentiate between the druggist and the dispensing pharmacist, we can at least endeavor to evolve a higher type of pharmacist on the lines suggested."

"In British pharmacy to-day there is need for a closer union of purpose, counsel and activity of all those who are working for a full realization of the profession of pharmacy."

"One of my dreams is of a central unifying association which shall bring together and coördinate those forces of which I have been speaking. The union of these forces—education, qualification, research, and professional conduct—should result in the evolution of a real profession of pharmacy, which, coexistent and interdependent with medicine, should work for the advancement of the health of the great nation to which we belong."

We quote the following from a recent editorial of *Clinical Medicine:* "Life is a series of adjustments. This is one of the greatest, most important, most far-reaching facts in human existence. The laws of nature function all about us and we cannot change them. Hence, to be in harmony with them, we must adjust ourselves to them." This is applicable to the development of pharmacy; we may desire to shape it to suit our aims and ideals, but public viewpoint and environment must be reckoned with.

The service pharmacy renders should be brought to the attention of the people, and therein the influence pharmacists can exert relative to many questions is

important. The doctors' duties include direction of the public to the end that laws of health, etc., are observed. In this pharmacists have the opportunities of coöperative service, and adequate educational training is a contributing factor. The higher educational qualifications are not altogether based on whether the graduates will make practical application of what they have learned in college—that depends on the individuals and environments—but the students are thereby supplied with the "foundation for the business of living;" "the usefulness and service of pharmacy and the drug business are exemplified by the number of its cultured votaries, in its men of education, enlightenment and character."

E. G. E.

DIFFERENT VIEWPOINTS REGARDING EDUCATION.

IT is not generally conceded that preliminary drug store training has value for the one who seeks to study pharmacy, or pass the examination of boards of pharmacy; at least, not of sufficient value to warrant the requirement of from two to four years of such application. Prof. H. M. Faser discussed the question in a paper before the Mississippi Pharmaceutical Association citing that the training of a young man or woman in a modern drug store is not the same as that in the shop of twenty-five years ago. The question comes up each year, in one way or another, as to whether all drug store experience should be had after graduation from a college of pharmacy, or be an entrance prerequisite. There will always be differences in the viewpoints of educators, just as there are of those who have applied themselves to the study of pharmacy, of those seeking such education and training; and some ask "why be educated?" The *New York World*, in a recent editorial, commented on the vagaries of education and pointed out that "the fallacy of vocational education as an ideal is demonstrated by the choice of subjects made by the working girls who are getting their first taste of college life at Bryn Mawr. They are girls from every industry—garment makers, telephone operators, tobacco workers, wrappers, labelers, machine packers, coil winders, bakers. They might have been expected to pick out courses that would throw light on their chosen work. In reality they prefer such studies as economics, literature, public speaking, history, physiology and music. What education they can get is a preparation for life, not for making a living."

"On the other hand, "the editorial continues, "Princeton University announces the establishment of courses in all the engineering branches. Princeton is supposed to cater to the well-to-do, who need not concern themselves too much with the usefulness of knowledge before the professional school is reached. Can it be that vocational work takes hold on the imaginations of the cultured just as those who must work for their daily bread are beginning to see through it? Or is this contrast merely the natural result of the desire for what one does not have? Garment workers are naturally fed up with work; they have had plenty of it; Princeton boys—or some of them—may look upon work as a privilege, or at least a variation from more artificial activities."

During the first week in July, the American Classical League, an association of educators who uphold the cause of cultural education, convened in Philadelphia. Leaders in public life have questioned the value of classical education because of

the narrowness of the former academic curriculum, and business men often measure values only in terms of dollars and cents. There is coming a realization that there are extremists on both sides of the question of education: that the vocational courses without some study of the classics do not properly educate the youthful citizens.

Pharmaceutical educators also have different viewpoints; studies of mathematics, history, Latin, etc., some contend, might be extended with additional years of pharmacy courses. By no means should the time in college be a measure of what the actual or direct needs or application of the pharmacist are in the pursuit of his vocation—education should mean much more than this.

Some medical colleges, with advanced requirements for medical education, provided only for the subjects of the first two years; but this, if we are rightly informed, has not proved successful. In colleges of pharmacy a similar plan might result otherwise if the first two years qualify the druggist and the subjects of study are so arranged that further application by the students leads to other degrees.

E. G. E.

LAW MAKING, RATIONAL AND IRRATIONAL.*

BY JAMES HARTLEY BEAL.

The faith of the average American citizen in the all-sufficiency of legislation to cure social, economic and moral evils is childlike and bland—a faith that is never chilled by the fact that rarely in his experience has he known a law to accomplish more than a fraction of the good that was predicted of it, and that many laws have either failed altogether or have introduced greater or more numerous evils than those they were intended to cure.

The framers of the American system of government proceeded upon the theory that the people who were least governed—who had the fewest laws to obey—were the best governed. To-day this ancient and once honorable doctrine is very much in the discard. No matter what evil is under consideration the first remedy thought of or proposed is legislation. The number of measures introduced during the life of a single Congress may run to ten or fifteen thousand, and even a state general assembly may be called upon to consider several thousand proposed new laws during a single session.

Granting that our highly organized civilization, with predominating industrial and economical interests, may require a more complex system of jurisprudence than would serve the necessities of a less specialized social organization, it is entirely absurd to assume that society needs the amount of regulation that these frantic attempts at law-making would indicate. Comparatively few of the proposed new laws possess any real merit. A large proportion simply reflect the spirit of meddlesomeness that governs the minds of those who gratuitously assume both their right and their ability to prescribe the standards according to which the remainder of their fellow citizens shall order their morals, their occupations and their daily lives.

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*Delivered before the Urbana Association of Commerce.

Assuming that we shall continue to grind out national and state legislation at the present rate, what will be the volume of written law in another twenty-five years?

No Law Can Be One Hundred Percent Efficient.—Another lesson of political history is that even the best law will fall far short of complete efficiency in removing the evils at which it is aimed. Whether we have one law or a thousand upon a given subject, there will always be a residuum of evil that mere law-making will not cure. When this irreducible minimum has been reached the multiplying of prohibitions only multiplies the number of violations.

It is an accepted principle in mechanics that no machine can be expected to reach 100 percent in practical efficiency, and the mechanician therefore directs his efforts to obtaining the most profitable ratio of power expended to work delivered. Strangely enough, people who do not expect to obtain one hundred percent efficiency from any construction of wood or metal, are forever trying to compose laws that shall be one hundred percent efficient, that is to say, laws that cannot be or that will not be violated.

Some thousands of years ago there was promulgated a code of Ten Commandments, governing the fundamentals of social and moral conduct, and in all the centuries since then the Divine Author of that code has neither repealed nor amended a single one of the ten original articles. A divine intelligence could be expected to understand that if men are disposed to disobey the commandments of a primary code they will be equally disposed to disobey the provisions of all subsidiary codes of amendments and regulations; but human law-makers, when they discover that one set of statutes is being violated, seem to imagine that by the adoption of a new code of regulations, or by rearranging the phraseology of the old code, the law violator will become a law observer.

The law-making bodies of this year are busy amending and reforming the laws adopted at previous sessions. Last year they were doing the same thing. Next year they will be repeating the process.

Each successive measure in its day was proposed as an important and necessary reform, and those who dared to oppose it were denounced as reactionaries and obstructionists, or worse. When in time its defects became evident, it was then attacked as an abuse by a new set of law-makers, the successive crops of reformers jumping over each other's heads like a group of boys at leap-frog.

What we all must learn is that the best possible law will fall considerably short of perfection, and that when any comprehensive and well-considered law has once been placed upon the statute books our attention should be given to its enforcement, and not wasted in impossible attempts to devise measures that cannot be violated.

Excessive and Radical Legislation Productive of Lawlessness.—Another lesson of political history that many reformers have failed to learn is that excessive and extreme legislation is of itself a most potent breeder of lawlessness.

Every student of history knows that, without exception, periods of excessive and radical regulation have always been followed by periods of equally extreme and radical reaction.

Seemingly there is a certain ratio or balance of regulation that must be maintained to obtain the best results for law and order. Human nature will stand for coercion without reaction up to a certain limit, but if this limit be exceeded there will be a moral break-down that makes the individual less amenable to the reasonable restraints of the law than before.

The very extremity of a law may constitute the most potent reason for its violation. In other words, the profits of violating the law may be so great, and the risk of punishment so small in comparison, that the hazard is really not much greater than the hazard of lawful occupations that are much less profitable. Such laws in effect place a premium upon law-breaking, and penalize the law-abiding citizens who are naturally inclined to obey the law themselves at a disadvantage as compared to those who ignore it, and there is a letting down of moral tone all along the line.

Most men believe that the chief function of government is to protect them from oppression. When the citizen comes to feel that the government itself has become an oppressor, he is already at heart a potential law-breaker, ready to evade the mandates of the law whenever he thinks it safe to do so.

The Failure of Emotional Legislation.—That some laws succeed fairly well in correcting the evils at which they are aimed, all can testify from personal observation; that some laws do not work at all, or have a back action that is worse than inaction, is a matter of common knowledge.

If we examine into a law that is known to work fairly well in practice we shall usually find it to be one that is not extreme in its provisions, and one that was formulated by cool and deliberate judgment in the light of well-established precedents. If we examine into the laws that are admitted failures we shall find almost universally that they are extremely drastic in their provisions, that they were composed under the influence of strong emotions and passed under the whip of intensive propaganda.

When our emotions are aroused in public affairs we want direct action and lots of it, and we mistrust the motives of those who urge less drastic measures as a more certain, though slower and less spectacular, method of reaching the desired end.

We regulated the railroads with our emotions instead of with reason and judgment until we regulated them nearly into bankruptcy. Now at tremendous cost we are painfully trying to work back to the line of reason and moderation.

When we undertook to regulate the trusts we again rejected the teachings of experience and the reasonable judgment of experts and followed emotional leadership with the result that we hoppled and haltered legitimate business enterprises without materially curbing the operations of those the law was intended to reach. This emotionally formulated law has not only operated to prevent small business men from combining to protect themselves from the aggressions of large capital interests, but every time Congress has passed an appropriation bill it has been reduced to the pitiful expedient of expressly providing that the money appropriated shall not be used to prosecute violations of the law by certain strongly organized interests.

Why is it that we have so frequently followed emotional leaders and rejected the counsel of conservative statesmanship? Simply because of our impatience for immediate results. It is the same disposition that prompts the teacher or doctor or merchant to withdraw his small hoard from the safety of the savings bank and invest it in oil stock that promises a thousand percent return.

Common horse sense, or even average mule intelligence, should teach us that in political affairs as in business enterprises the more profuse the promises the less likely the performance. The promoter of "get-rich-quick" concerns can always promise greater returns on the investment than can be offered by the promoters of legitimate business undertakings.

Laws Fail When They Ignore Human Nature.—Another lesson from the history of political experiments is that laws fail when they ignore the ordinary qualities of human nature instead of operating in harmony therewith.

The engineer who digs a tunnel, or drains a swamp, or irrigates a desert does not begin operations without a careful and scientific study of all the surrounding conditions. Sometimes he finds a direct method of approach the most suitable, sometimes an indirect approach, and his success is measured by his ability to adjust his methods to the peculiar circumstances in each case. Sentiment finds no place in his plans. He does not ignore or attempt to violently suspend the operation of natural laws, but seeks to utilize them in the attainment of his purpose. He does not attempt to destroy the natural tendency of water to flow down-hill, but makes use of a fall of water at one place to carry water up-hill at some other place.

The reformer of political and social institutions, in his anxiety for direct and immediate results, rarely takes time to patiently study the particular conditions involved, refuses to be bound by the laws of human nature, and will not consider any other method of approach than the age-old formula "it is forbidden," which in the history of civilization has failed as often, if not oftener than it has succeeded.

Some evils of the body politic are of such a nature that the only proper course of procedure is to totally prohibit them, but others are like the tares in the wheat that cannot be directly uprooted without uprooting the wheat also.

Human nature in the mass can be led by education and persuasion; it cannot be successfully driven. Laws that are passed by tricky political methods or adopted with the grudging assent of a bare majority, and which attempt to violently uproot world-old prejudices or beliefs in a day, retard rather than advance genuine reform.

Consider also the bulk of secondary legislation in the form of rules and regulations adopted by the administrative officers of the law. Congress adopts a measure covering four or five pages, whereupon the department of administration issues a code of regulations covering fifty or sixty pages, introducing obligations and producing results which the original law-making body could not have contemplated.

This country began its existence with the freest government on the face of the earth, and under this freest of governments our people have prospered as no people ever prospered before. Unless the present craze for law-making can be checked, the next generation will find itself subject to more regulation than was old *verboten*-ridden Germany, and under the rule of more bureaus and bureaucrats than Russia under the Czars.

The Inability of Reformers to Learn from Experience.—Somehow men do not

seem to learn, or at least do not heed the lessons of experience in politics as they do in the lessons of the physical sciences.

In the physical sciences facts once ascertained by careful experimentation are recorded in literature and become a part of the general inheritance of the race, so that men do not waste their lives in forever trying out the things that have been fully tested previously.

In political science, however, we do not seem to be able to record well-established political and economic facts in such a way as to impress them upon the popular mind and save the world from endlessly trying over and over the same old experiments that have been tried and have failed numberless times before. These facts have been recorded, however, and are available to those who will take the trouble to look for them.

Successful Laws Mark Reforms But Do Not Make Them.—One of the facts we may learn from the history of political experiments is that successful laws do not make reforms, but only mark them, that is, they mark the periods when the reforms have so far gained the consent of the minds and hearts of the people that the written statutes are merely concrete expressions of the will of a liberal majority of those who are to live under them.

If a proposed reform will really make the world a better place to live in, it is necessary only to convince a majority of the people of its wisdom and desirability, when appropriate legislation will follow logically and naturally. Generally, however, the radical reformer resents the slow and cumbrous methods of education and prefers to make an organized assault upon the law-making body and compel an immediate acceptance of his so-called reform by act of legislature.

When his premature law is openly derided and violated with comparative impunity, the reformer will not admit, and probably does not realize, that the legislation was in advance of genuine public sentiment. His remedy is to adopt still more legislation of the same kind, piling prohibition upon prohibition and penalty upon penalty, with the result of producing an ever-increasing number of violations, and correspondingly diminished respect for the authority of the law.

If mere law-making could make men or society perfect the world would have been free from evil several millenniums ago. Every known political and social tort has been legislated against thousands of times and yet these wrongs persist and not a few when traced to their sources will be found to be the direct outgrowth of the very laws intended to prevent them.

Reform Legislation Imposes Burdens upon Innocent People.—Another fact to be learned from the history of experiments in law-making is that reform measures invariably impose burdens upon perfectly innocent people who do not stand in need of reformation, and invariably place restrictions upon acts that may be wholly without evil or even meritorious.

This has been true of every piece of reform legislation that has ever been placed upon the statute books. The best of reform measures are mixtures of good and evil, and not a few of such measures have been responsible for the growth of greater evils than those they were intended to cure.

Common sense, therefore, demands that we take into consideration the burdens a proposed law will certainly impose upon innocent people and upon innocent

industries, as well as the good results which it is hoped the law will produce. Like other things, reforms can be had only for a price, and sometimes cost more than they are worth.

The exact point at which the evils of a reformatory law begin to outweigh the good cannot be determined with certainty in advance of actual trial, but experience teaches that it usually falls far short of the extreme limit which the radical reformer is inclined to demand.

Excessive Regulation Precedes the Destruction of Liberty.—Another fact frequently brought to the attention of the student of political history is that peoples who have obtained their liberties by the most heroic of sacrifices have so frequently thrown them away again in the frivolous pursuit of things they thought would make their liberties still more secure and their freedom still more free.

The story of the democracies that have failed shows that their vigor and prosperity regularly declined with the growth of internal legislation, or with the forcing of obnoxious regulations upon their citizens by the factions which successively obtained control, until they had so weakened themselves by internal strife that they fell to pieces of their own weight or were an easy prey to enemies from without.

Of course no people ever intentionally destroyed their own liberties. They always intended their law-making to make their countries better and stronger. Their uniform mistake was in consenting to the violation of fundamental principles for the sake of some fancied immediate good which their radical legislation was expected to accomplish.

The one great lesson of all these unsuccessful attempts at self-government is that a nation which willingly submits to the suspension of the principles of free government for the sake of expediency, or for the accomplishment of some quick and immediate reform, will in the end always come to grief. Principles that can be suspended for beneficent purposes can also be suspended for evil purposes, and laws intended for purely good ends can also be enforced oppressively.

The Fundamental Principles of Free Government Are Permanent.—Another lesson from the history of political experiments is that the fundamental principles of free government do not vary with the changing values of the factors of civilization. A principle of government essential to the preservation of liberty in one age is essential to the preservation of liberty in every age.

By certain doctrinaire reformers of the present day the United States Constitution is considered to be obsolete and out of date because it was composed before the age of telephones, wireless telegraphy and flying machines. It would be as reasonable to consider the principles of arithmetic obsolete because they were discovered before the invention of modern business methods.

Civil government is not a problem of mechanics, but of human nature, and no group of men who ever lived had a keener or closer information of the essential qualities of human nature than the group of statesmen who formulated the Federal Constitution and the Bill of Rights that was made a part of that document. They were not only men of rare natural ability, but they met their task with a face-to-face directness and with a freshness of experience with governmental tyranny that their successors have not had.

These men said: No government has ever had unlimited power over the lives and destinies of its people that it did not eventually exercise its powers oppressively. We will prevent such a disaster by making it a fundamental principle of the Federal Constitution that the powers of the government shall be limited strictly to matters of general concern, and will prohibit its interference in the lives and liberties of the individual citizen, except insofar as they are intimately and directly connected with the powers expressly given. Similar consideration induced the placing of corresponding restrictions upon the powers of the governments created by the earlier state constitutions.

It is not too much to say that under the dual form of government thus founded our people have enjoyed a greater degree of national prosperity and a greater degree of personal liberty coupled with order than ever before existed.

Unfortunately the members of the present generation have generally failed to grasp the fact that the prime reason why our state and national governments have not hitherto ruled oppressively is because they have not had the power to oppress.

The doctrinaires are now ready to tear these old and well-tried charters of liberty to pieces and to confer upon the legislative and executive departments the very powers which the elder group of statesmen were certain should be withheld from them. Perhaps the doctrinaires are right; but if our government can possess unlimited powers without using them oppressively, it will be the first instance of its kind in all the history of civilization.

We Talk Eugenics and Practice Anti-Eugenics.—One who should study the accomplished and attempted legislation of the last quarter of a century might reasonably arrive at the conclusion that the chief object of civil government is to protect the mentally incompetent, the morally weak or vicious and the physically unfit. He would observe, for example, that the law makes it difficult to secure useful and necessary drugs for the treatment of the mentally and morally competent in order to keep them out of the hands of degenerates who might use them to their own hurt. He would discover legislation to handicap the enterprising and progressive business man in order to enable the less enterprising and less progressive to succeed. He would note the legalization of trade union rules designed to penalize the skilled and industrious artisan and prohibit him from producing more or better work than the unskilled and the lazy. He would discover numberless schemes, either accomplished or in process of accomplishment, designed to pension the lazy, incompetent and wasteful members of society and to collect the pensions from the industrious, competent and economical members. He would observe parlor philosophers talking about the importance of developing a mentally fit and physically strong and virile race and advocating governmental and social policies designed to produce the opposite.

Since we have such an abundance of societies and devices intended to favor and protect weaklings and degenerates, would it not be timely for humane people to establish a society to protect the rights of those who are neither weak nor vicious, who exercise proper restraint upon their appetites and passions, who are industrious and thrifty, and in every way prove their right to respectful consideration?

Is it not time to return to the viewpoint of the fathers of the republic as to the proper functions of government, and to realize that the sane and decent members of society possess certain inalienable rights of which they should not be deprived in order to confer special benefits or special protection upon those who do not deserve, or who have abused the privileges of citizenship?

DOMESTIC AND IMPORTED *VERATRUM* (HELLEBORE), *VERATRUM VIRIDE* AIT., *VERATRUM CALIFORNICUM* DURAND, AND *VERATRUM ALBUM* L.

I. BOTANICAL STUDIES.

BY ARNO VIEHOEVER, GEORGE L. KEENAN, AND JOSEPH F. CLEVENGER.*

With the resumption of importation of European drugs difficulties are being experienced regarding their identification. A notable example is *Veratrum* (Hellebore).

The name Hellebore, while mainly applied in this country to drugs derived from *Veratrum* species, is also used for *Helleborus* species, especially in Europe and in connection with Black Hellebore. The *Helleborus* species, however, belong to an entirely different family (Ranunculaceae), while the Veratrums belong to the Melanthaceae. Since, fortunately, the roots of these families are so different, instances of substitution of Helleborus for Veratrum species are probably not numerous. Some confusion has arisen, however, from the use of the name of White Hellebore for roots obtained from both *Veratrum album* and *Veratrum viride*. The former is not native and is usually obtained from Europe, and therefore sometimes referred to as "Imported White Hellebore;" the latter, being native, is at times referred to in the trade as "American" or "Domestic White Hellebore." While the United States Pharmacopoeia VIII recognized both *Veratrum album* L. and *Veratrum viride* Ait. as official, the last issue (IX rev.) only recognizes *Veratrum viride* Ait.

It is pointed out in the literature that the plants are very much alike and the roots and rhizomes obtained from either plant cannot be distinguished. The subject has received considerable attention in the past, not only from taxonomists, but also from histologists, chemists, and pharmacologists. The studies with regard to histological data have not led to definite results, either in proving the identity or distinct differences of *Veratrum album* and *Veratrum viride*. The question has therefore been taken up anew. Authentic samples, collected in the Appalachian mountains, as well as commercial samples, collected in import and interstate trade, were examined.[1] Since we were primarily called upon to establish, if possible, differentiations between these commercial products as they appear upon the market, we have given the histological characteristics, and some of the factors which may influence them, our special attention. We have also studied other characteristics considered of value for differentiation.

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*Joint contribution from the Pharmacognosy Laboratory and from the Insecticide and Fungicide Laboratory, Miscellaneous Division, Bureau of Chemistry.

[1] Some of the material used in this investigation was collected by R. C. Roark, formerly a member of the Insecticide and Fungicide Laboratory, Bureau of Chemistry.

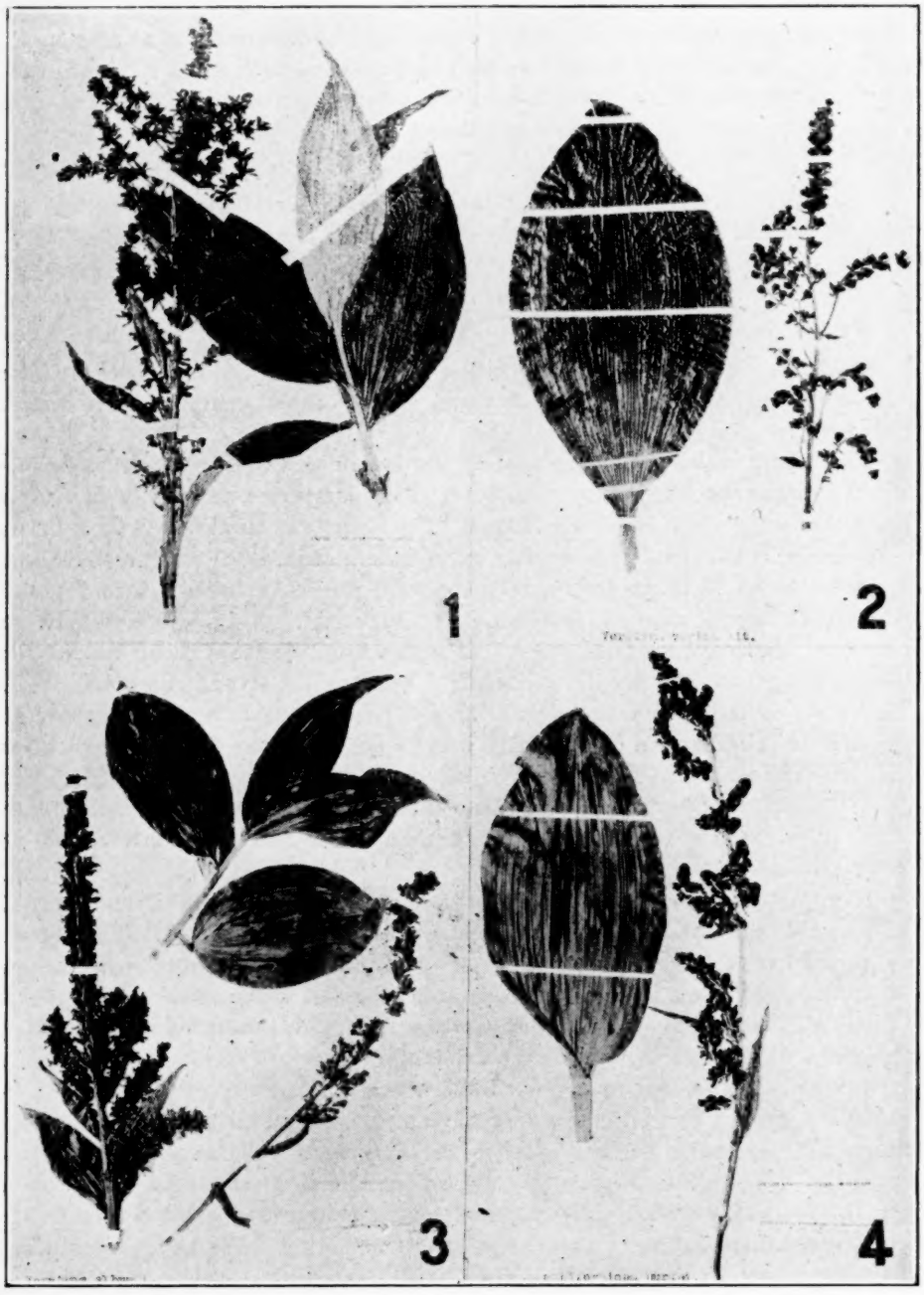

Plate I.—Illustrates habit of *Veratrum viride* (1 and 2), *Veratrum album* (3), and *Veratrum californicum* (4). × 1/5.

Some attention was given to *Veratrum californicum* Durand, a form which has been described as *Veratrum album* Watson. This plant appears to grow rather abundantly in the western part of the United States. A statement is also included with regard to *Veratrum nigrum* L., a European form which has been considered a possible substitute in Europe for *Veratrum album*.

TAXONOMY.

The three forms, *Veratrum viride* Aiton, *Veratrum californicum* Durand, and *Veratrum album* L., pending further investigation, might be considered as species, though their relationship is indeed very close. This view of close relationship is generally recognized. A brief discussion of views concerning the taxonomy of these forms may be of interest.

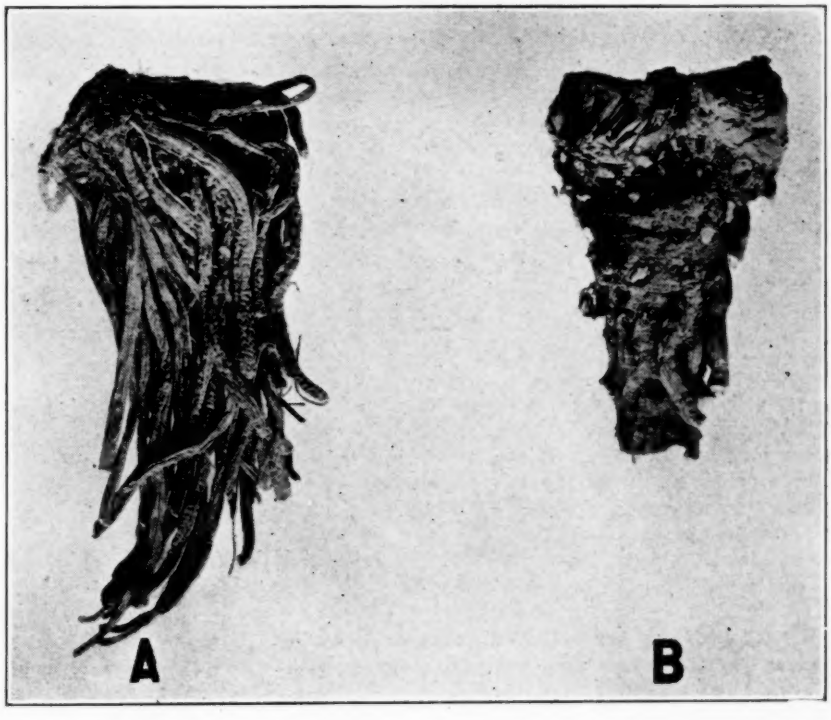

Fig. 1.—*Veratrum album*. A—Rhizome with roots; B—Rhizome with crown of leaf scales, roots removed. Approximately natural size.

There are botanists and others (4, 5, 8,) who consider the domestic form *Veratrum viride* Aiton as *Veratrum album* L.. Moeller (6) still considers *Veratrum viride* Aiton as a variety of *Veratrum album* L. According to Bentley and Trimen (1) the form described as *Veratrum album*, var. Regel, is synonymous with *Veratrum viride* Aiton. Watson (9) includes among others *Veratrum parviflorum* Bong and *Veratrum escholtzii* Gray under the species *Veratrum viride* Ait.

Veratrum album L., the imported form, according to Flückiger (2), and Bentley and Trimen (1), is identical with *Veratrum viridiflorum* Kunth and *Veratrum lobelianum* Bernh., representing a variety of *Veratrum album*. In Index Kewensis

(3) *Veratrum escholtzii* Gray, *Veratrum lobelianum* Bernh., *Veratrum polygamum* Gilib., are also considered synonymous with *Veratrum album* L.

According to Bentley and Trimen, *Veratrum californicum* Durand is a plant identical with *Veratrum album* L. Flückiger considers it a transitional form between *Veratrum viride* Ait., and *Veratrum album* L. Watson regards it as a distinct species and points out that the plant he described as *Veratrum album* Wat., was *Veratrum californicum* Durand.

BOTANICAL CHARACTERISTICS.

(*a*) *Plants.*—The subject of the plant characteristics of the different species *Veratrum album*, *Veratrum viride*, and *Veratrum californicum* has been given limited attention. Only herbarium specimens and descriptions in literature were studied. A table of data referring to ecological as well as morphological characteristics of the plants is given below. Plate I illustrates the general habit of the plants.

TABLE I.—DESCRIPTION OF PLANTS.*

	Veratrum viride Ait.	*Veratrum album* L.	*Veratrum californicum* Durand.
Habitat	In swamps and wet woods.	Moist meadows in mountainous districts.	Wet meadows and springs in mountainous regions.
Rhizome	Erect, with numerous fibrous fleshy roots. 3 to 5 cm. long to about 2 cm. thick.	Similar to *viride* with roots less fleshy. 5 to 7 cm. long to about 2.5 cm. thick.	Similar to *viride* with apparently larger rhizomes and larger coarse fibrous roots.
Stem	Stout; 60 to 240 cm. tall, pubescent.	Stout; 120 cm. tall, pubescent.	Very stout; 90 to 180 cm. tall, pubescent.
Leaves	Acute; lower broadly elliptic, sheathing, 15 to 30 cm. long by 7 to 15 cm. wide; pubescent; the upper ones successively narrower; those of the inflorescence small, oblong, lanceolate.	Similar to *viride*, but smaller, with upper leaves less acuminate.	Similar to *viride*.
Panicle	20 to 40 cm. long, densely many-flowered; lower branches spreading or somewhat drooping.	30 to 40 cm. long, flowers numerous, shorter pedicels than in *viride;* lower branches not drooping.	30 to 40 cm. long; similar to *viride*, with ascending branches.
Flowers	Yellowish green. Perianth segments oblong or oblanceolate, 2 to 2.5 cm. broad.	Pale greenish yellow. Perianth segments ovate, sub-acute or obtuse, somewhat broader than in *viride*.	Greenish or cream. Perianth segments oblong obovate or oblanceolate; 0.8 to 2.0 cm. long.
Fruit	Ovary glabrous; capsule 3-celled; 2 to 2.5 cm. long, 0.8 to 1.1 cm. thick; many-seeded.	Capsule 3-celled; many-seeded. 2.25 cm. long, 1.1 cm. thick.	Ovary glabrous; capsule oblong, ovate acute, 2.5 cm. to 3.3 cm. long; many-seeded.

*Based on data in literature and also observations of limited number of Herbarium specimens.

As may be seen from data on the table, the form of the leaves, and especially the structure of the inflorescence, may be considered rather characteristic. Bastin (11), Schrenk (16), Denniston (12), Flückiger (2), have considered both *Veratrum viride* and *album* in their studies. Holm (13), studied *Veratrum viride*, and Meyer (15) and Koch (14) only *Veratrum album*. Bastin (11), Schrenk (16), Denniston (12), and Flückiger (2), as well as the textbooks dealing with the subject, agree that the rhizomes cannot be differentiated, either by external or internal morphology. Schrenk (16) is the only one who discovered a structural difference in the cell walls of the endodermis of the roots, results which we, in general, have been able to confirm. Bastin (11) points out that the rhizome of *Veratrum album*, in contrast to that of *Veratrum viride*, has the roots mostly trimmed away. Bentley and Trimen (1) point out that both kinds of *Veratrum album* may be found in commerce with and without roots (fibers.) The samples which we have observed have been whole, with attached roots and basal leaf scales. Denniston (12) describes the rhizome of *Veratrum viride* as being generally split longitudinally. Holm (13) found it in commerce as small fragments. We have usually found *Veratrum viride* to consist of rhizomes split longitudinally, with roots and basal leaf scales attached. Fig. 1 is introduced to illustrate the average appearance of rhizomes with and without roots. Fig. 2, A and B, show the gross structure of rhizome in longitudinal and cross-sections.

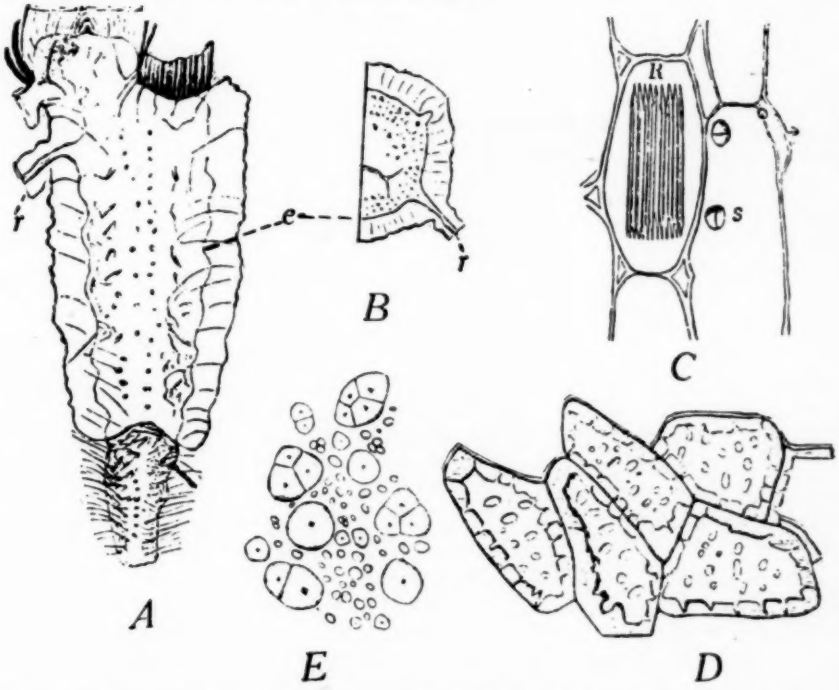

Fig. 2.—*Veratrum album*. A—Rhizome, longitudinal section; B—Rhizome, cross-section; C—Root. Tangential section, calcium oxalate raphides, approximately × 150; D—Rhizome. Endod rmal, cells approximately × 200; E—Starch. A, B, C, D, after Meyer; E, after Bastin.

The principal histological characteristics, based upon our own findings and a critical study of statements in the literature, are tabulated below. Plate II is introduced to show general microscopical structures of the roots and should facilitate orientation of cells and cell structures, referred to in the table and text.

TABLE II.—HISTOLOGICAL CHARACTERS OF THE RHIZOME.*

Transverse Section.

Veratrum viride Ait.	*Veratrum album* L.	*Veratrum californicum* Durand.
	Cortex.	
1. Metadermis: Transformed cells; walls uniformly brown, thick, no suberin reaction.	1. Metadermis: Transformed cells; walls uniformly brown, thick, no suberin reaction.	1. Metadermis: Cell walls uniformly brown, thick, no suberin reaction.
2. Parenchyma: Circular, almost isodiametric in cross-section; roughly pitted; starch grains single, 2 to 3 compound.	2. Parenchyma: Almost isodiametric in cross-section; starch grains single, 2 to 3 compound.	2. Parenchyma: Almost isodiametric in cross-section; very little starch observed.
3. Raphide bundles: Not numerous; length about 0.054 mm. to 0.1 mm., averaging about 0.07 to 0.08 mm.	3. Raphide bundles: Not numerous; length about 0.038 to 0.070 mm., averaging about 0.05 to 0.06 mm.	3. Raphide bundles: Not numerous; length about 0.075 to 0.18 mm., averaging about 0.096 to 0.140 mm.
4. Fascicular bundles occasional.	4. Fascicular bundles occasional.	4. Fascicular bundles occasional.
	Central Cylinder.	
1. Endodermis: Located between cortex and central cylinder; wavy or one-layered except locally. Cells thickened on inner tangential and radial walls; lumen more or less 1/2 width of cell; walls somewhat lignified.	1. Endodermis: Located between cortex and central cylinder; wavy or one-layered except locally. Thickening on inner tangential and radial walls more pronounced than in *V. viride;* lumen more or less 1/3 width of cell; walls somewhat lignified.	1. Endodermis: Located between cortex and central cylinder; wavy or one-layered except locally. Thickening on inner tangential and radial walls more pronounced than in *V. viride* and *V. album.*
2. Stele: Pericambium cells, radial groups of vascular cells alternating with groups of sieve tissue enclosing more or less sclerenchymatized parenchyma.	2. Stele: Pericambium cells, radial groups of vascular cells alternating with groups of sieve tissue enclosing more or less sclerenchymatized parenchyma.	2. Stele: Pericambium cells, radial groups of vascular cells, alternating with groups of sieve tissue enclosing more or less sclerenchymatized parenchyma.

*Leaf scales commonly attached to the rhizome show crystals usually longer than those present in rhizomes and roots.

TABLE III.—HISTOLOGICAL CHARACTERS OF ROOT.

Transverse Section.

Veratrum viride Ait.	*Veratrum album* L.	*Veratrum californicum* Durand.
	Cortex.	
1. Epidermis: Cells more or less quadratic; outer tangential wall curved, walls lignified. *Longitudinal section, about 0.05 to 0.105 mm. in length, averaging about 0.060 to 0.080 mm.*	1. Epidermis; Cells more or less quadratic; outer tangential wall curved, walls lignified. *Longitudinal section, about 0.07 to 0.15 mm. in length and averaging about 0.09 to 0.12 mm.*	1. Epidermis: Cells more or less quadratic; outer tangential wall curved, walls lignified. *Longitudinal section, about 0.06 to 0.19 mm. in length, averaging about 0.09 to 0.14 mm.*
2. Hypodermis: (a) Outer endodermis: Long and short cells similar to epidermis, cellulose, sometimes compressed. (b) Collenchyma: Often 2 to 3 rows, sometimes interrupted near aerenchyma.	2. Hypodermis: (a) Outer endodermis: Long and short cells, similar to epidermis, cellulose, sometimes compressed. (b) Collenchyma: Often 2 to 3 rows, sometimes interrupted near aerenchyma.	2. Hypodermis: (a) Outer endodermis: Long and short cells, similar to epidermis, cellulose, sometimes compressed. (b) Collenchyma: Often 2 to 3 rows, sometimes interrupted near aerenchyma.
3. Aerenchyma: Air spaces surrounded by disorganized parenchyma cells; more pronounced than in *V. album*.	3. Aerenchyma: Air spaces surrounded by disorganized parenchyma cells; not so pronounced as in *V. viride*.	3. Aerenchyma: Air spaces surrounded by disorganized parenchyma cells; pronounced.
4. Parenchyma: Cells more or less circular, larger below epidermis, smaller towards central cylinder; contain starch, spherical or ellipsoidal, single, 2 to 3 compound, about 0.005 to 0.018 mm. in diameter. Crystal cells vary in length, *raphides about 0.045 to 0.120 mm. in length and averaging about 0.060 to 0.080 mm.*	4. Parenchyma: Cells more or less circular, larger below epidermis, smaller towards central cylinders; contain starch, spherical or ellipsoidal, single, 2 to 3 compound, about 0.005 to 0.018 mm. in diameter. Crystal cells vary in length, *raphides about 0.04 to 0.70 mm. length and averaging about 0.05 to 0.06 mm.*	4. Parenchyma: Cells more or less circular, larger below epidermis, smaller toward central cylinder. (Starch found to be very small in amount and disorganized in material examined.)
	Central Cylinder.	
1. Endodermis: Located between cortex and central cylinder; cells with inner tangential and radial walls thickened, slightly lignified, *U-shaped lumen diagnostic (longitudinal section lumen more or less 1/2 width of cell;* about 0.09 to 0.215 mm. in length and averaging about 0.15 to 0.20 mm.).	1. Endodermis: Located between cortex and central cylinder; cells with inner tangential and radial walls considerably thickened, apparently lignified, *V-shaped lumen diagnostic (longitudinal section, lumen more or less 1/3 width of cell;* about 0.06 to 0.30 mm. in length and averaging about 0.150 to 0.200 mm.).	1. Endodermis: Located between cortex and central cylinder; cells with inner tangential and radial wall, considerably thickeneds shape of lumen intermediate between U and V, rather elongated (longitudinal section, lumen more or less 1/4 width of cell; about 0.070 to 0.250 mm. in length and averaging about 0.10 to 0.170 mm.).

TABLE III.—HISTOLOGICAL CHARACTERS OF ROOT (*Concluded*).

Veratrum viride Ait.	*Veratrum album* L.	*Veratrum californicum* Durand.
2. Stele: Contains fascicular bundles; raphide bundles not so numerous in parenchyma of cylinder.	2. Stele: Contains fascicular bundles; raphide bundles not so numerous in parenchyma of cylinder.	2. Stele: Contains fascicular bundles; raphide bundles not so numerous in parenchyma of cylinder.

Rhizome.—It may be seen from Table III that so far as the differentiation of the rhizomes is concerned, the length of the calcium oxalate raphides* located in special cells (Fig. 2, C) can be used. In addition, we find that the thickening of the inner tangential and radial walls of the endodermal cells may also be used. These cells differ markedly in the degree of the thickness of the walls, *Veratrum viride* showing the least, and *Veratrum californicum* the most pronounced thickening. Fig. 2, D, illustrates in a suggestive way the general outline of these cells.

Roots.—These thickenings are even more pronounced in the roots, and enable one to differentiate the species in the powder. Illustrations showing the characteristic thickenings of the roots are given for transverse as well as longitudinal sections (Plate III). The calcium oxalate raphides appear to be more numerous in the roots and may readily be found in longitudinal sections and in the powder. An additional means for differentiation is found in the epidermal cells of the root, especially in longitudinal sections. Here again, the epidermal cells of *Veratrum viride* are shorter than those of *Veratrum album*. *Veratrum californicum*, on the other hand, has longer epidermal cells than either of the species already mentioned. Starch grains, in confirmation of Bastin's (10) and Denniston's (12) findings (see Fig. 2, E), showed no striking differences in *Veratrum viride* and *album*.

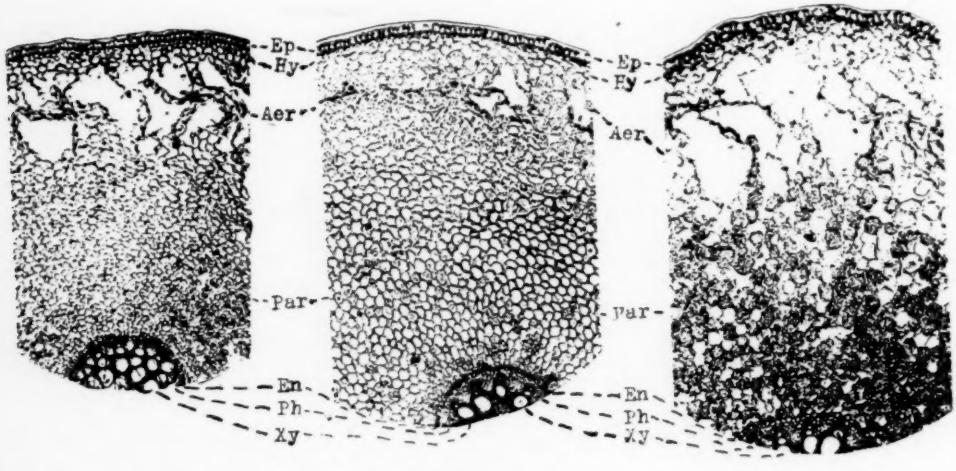

Plate II.—Cross-sections of roots; epidermis (Ep), hypodermis (Hy), aerenchyma (Aer), parenchyma (Par), endodermis (En), phloem (Ph), and xylem (Xy). V—*Veratrum viride* × 50; A—*Veratrum album* × 50; C—*Veratrum californicum* × 25.

*The identification has been verified by microchemical and optical methods.

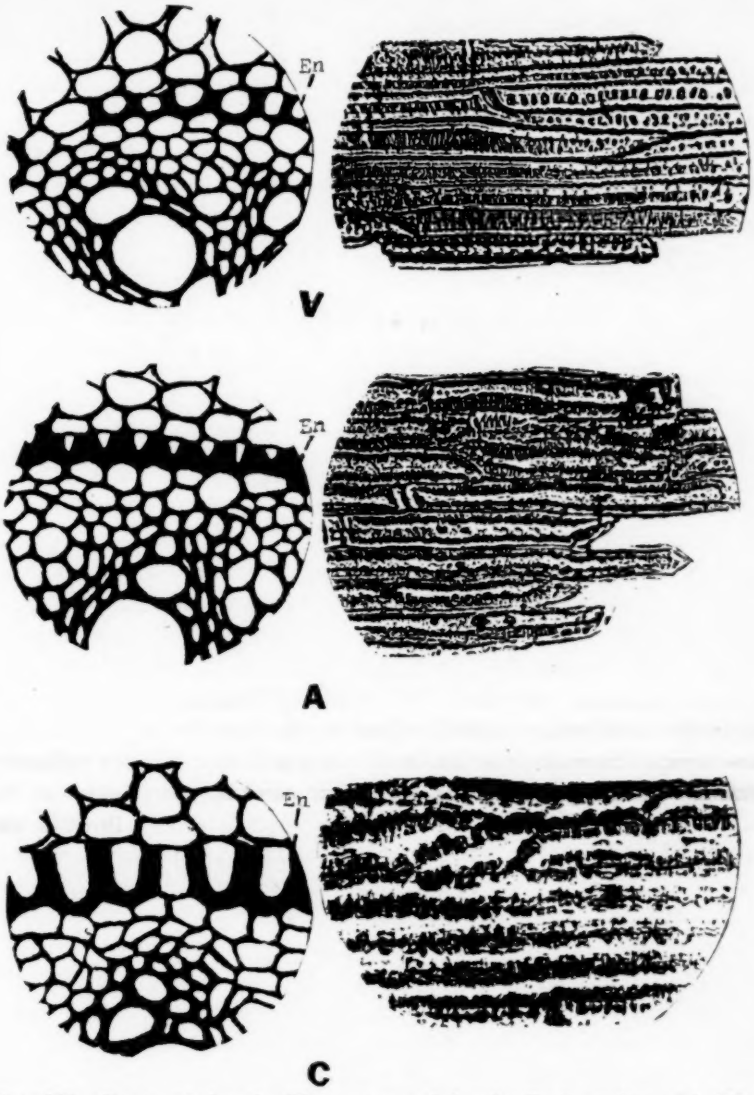

Plate III.—Root endodermis (En), cross and longitudinal section. × 400.
V—*Veratrum viride;* A—*Veratrum album;* C—*Veratrum californicum.*

Basal leaf scales.—Short leaf scales (Fig. 1, B) may or may not be present, forming a crown to the rhizomes of *Veratrum album* and *Veratrum viride.* They contain calcium *oxalate raphides,* which are considerably longer than those in either the roots or rhizomes. The occasional presence of the scales in the powdered drug may render the use of the raphides less reliable as a means for differentiation.

Material of *Veratrum viride,** collected from dry and moist locations, showed variations in the character of the lumen of the endodermal cells. Plants growing in moist situations showed the lumen typical for the endodermal cells of *Veratrum*

*These plants were found growing on Spruce Knob, W. Va.

viride, while those of plants growing in unusually dry locations showed a lumen approaching the V-shape characteristic of *Veratrum album*. The length of the crystals in the material was found to be essentially the same. The result of the sulphuric acid reaction was too variable to be entirely satisfactory.

Veratrum nigrum is differentiated by its relatively smaller cylinder in the root; it also shows relatively much less parenchyma in the rhizome (15).

Determinations Made on Commercial Samples of Veratrum (Hellebore).—The data thus far reported in this investigation are the result of work done on material especially collected for the project. It seemed desirable also to secure more comprehensive data regarding commercial samples of hellebore. A large number of samples, both of the powdered and crude material, were therefore collected from a number of dealers in botanicals and determinations made as to the identity of the product, irrespective of the label upon it. The results of these determinations have been recorded in Table IV.

MICROCHEMICAL TESTS.

A number of investigators have given the color reactions obtained with different reagents some attention. Denniston (12) points out that *Veratrum album* and *Veratrum viride* might be differentiated by the color reactions which concentrated sulphuric acid produces with these drugs. Concentrated hydrochloric acid and other reagents have been recommended. We have tried both cold and warm hydrochloric acid without any distinctive results. Different concentrations of sulphuric acid were also applied, the most satisfactory results being obtained with concentrated sulphuric acid when added either to the powder or the sections. In the case of *Veratrum viride* the reaction obtained consisted of a distinct yellowish tint observed immediately after applying the sulphuric acid to the powder or the sections. It appears that the chemical substance producing the yellowish tint immediately diffuses in the acid. For this reason, a powder or section treated with the concentrated sulphuric acid must be directly observed, otherwise the yellow tint will be affected by the red coloration which soon appears. In the case of *Veratrum album* the color change appears more limited to the vegetable material and the characteristic orange or red tint observed occurs immediately after the acid has been applied. Direct observation is essential also in this case. No yellow tint was observable. In either case, the color changes, to red and finally to dark reddish brown, were more or less influenced by the charring of the plant material. The application of the sulphuric acid test to a large number of samples indicated that there were instances where the color differences were not so clearly defined in the two species. The color reaction will usually be found valuable as a confirmatory test but not entirely satisfactory in itself. The same test was applied to *Veratrum californicum*, with the result that the color reaction is not markedly different from *album*, indicating rather an intermediate tint between that given by *Veratrum viride* and *Veratrum album*. The color obtained with concentrated sulphuric acid in sections indicated that the alkaloids are mainly located in the parenchymatic and collenchymatic tissue below the epidermis. The findings of Rundquist (20) seem thus confirmed, while those of Borscow (19), who found the alkaloid mainly located in the cell walls of the epidermis and endodermis, could not be verified.

TABLE IV.—EXAMINATION OF VERATRUMS (HELLEBORE).

Ph No.	Label.	Identification. Scientific name.	Common name.	Condition.	Color with Con. H_2SO_4.	Lumen of endodermal cells.	Crystals in microns.* Min.	Av.	Max.	Origin of sample.	
				Veratrum Album.							
3124	White Hellebore	*Veratrum album*	White Hellebore	Powdered	Red	V-shape	44	61	76	Commercial, imported	
3128	" "	"	"	"	"	"	44	60	76	"	"
3130	Japanese White Hellebore	"	"	"	"	"	49	62	76	"	"
3123	White Hellebore	"	"	"	"	"	40	60	85	"	"
3129	American Hellebore	"	"	"	"	"	44	59	87	"	domestic
3134	White Hellebore	"	"	"	"	"	40	60	87	"	imported
3159	" "	"	"	"	"	"	49	59	87	Commercial	
3165	" "	"	"	"	"	"	40	60	87	Commercial, imported	
3160	Hellebore	"	"	Whole	"	"	38	63	88	Commercial	
3131	Japanese White Hellebore	"	"	"	"	Suggesting more U-shape	50	70	100	Commercial, imported	
3164	White Hellebore	"	"	"	"	V-shape	40	60	100	"	"
3167	" "	"	"	Powdered	"	"	55	80	109	"	"
3136	" "	"	"	"	"	"	55	74	120	"	"
				Veratrum Viride.							
3139	White Hellebore	*Viratrum viride*	Green Hellebore	Powdered	Yellow	U-shape	60	81	109	Commercial, domestic	
3140	American White Hellebore	"	"	"	"	"	55	78	112	"	"
3113		"	"	Whole	"	Approaching V-shape	57	82	114	Collected on dry mountain, West Virginia	
3117	*Veratrum viride*	"	Hellebore	"	"	"	57	88	114	Slightly moist plateau in North Carolina	
3132	" "	"	Green Hellebore	"	"	U-shape	57	81	114	Commercial, domestic; low, dry ground	
3106	" "	"	"	"	"	"	60	80	115	Commercial, domestic	
3122	American Hellebore	"	"	"	"	"	60	88	120	"	"
3135	White Hellebore	"	"	Powdered	"	"	55	86	120	Commercial	
3141	*Veratrum viride*	"	"	"	"	"	80	100	120	Commercial, domestic	
3166	American Hellebore	"	"	"	"	"	55	82	120	"	"
3163	" "	"	"	Whole	"	"	44	80	131	"	"
3121	White Hellebore	"	"	Powdered	"	"	62	91	135	"	"

*Values given are based upon at least 25 measurements. Sizes may differ in other samples due to variation in composition (leaf scales), etc. See text.

Use as an Insecticide.—Veratrum has been used in the past as a poison against animals and certain insects, and its insecticidal value appears established. Recently experiments have been carried out, using hellebore, in attempts to kill fly larvae in manure piles (17, 18). The results have been positive, showing a distinct insecticidal value in this material applied in powdered form or extract. The investigational work has been done probably in the main on *Veratrum viride*, and the results do not, therefore, permit of a definite conclusion as to the comparative value of either *Veratrum album* or *Veratrum viride*.

Commercial Data Regarding Veratrum.—With regard to the extent of importation, no definite data appear available. Recently new shipments in considerable amount have entered this country from Europe. These shipments proved to be *Veratrum album*. To our knowledge, no *Veratrum viride* is exported. Definite information with regard to the extent to which the domestic hellebore enters commerce is not available to us. In the following table are given the market prices of the crude powdered drugs during the period from 1914 to 1920:

TABLE V.—PRICE FLUCTUATIONS OF DOMESTIC AND IMPORTED VERATRUM.

Quotation per pound.*

	Imported white. (*V. album.*)		Domestic green. (*V. viride.*)	
Year.	Whole sample.	Powdered sample.	Whole sample.	Powdered sample.
1914–1916	9–10 cents	10–13 cents	.....	.....
1916	.....	20–25 cents	.....	.....
1917	40–45 cents	.....	.....	.....
1918	.....	26–28 cents	22 cents	24 cents
1920	20 cents	22 cents	20 cents	22 cents
1921	.....	19–20 cents	20 cents	19–20 cents

*Drug and Chemical Markets. *Oil, Paint and Drug Reporter.*

An examination of this table would seem to indicate that the price is apparently influenced by the supply of and the demand for the crude botanical and not so much by the specific demand for either the white or green Veratrum.

SUMMARY.

1. Means are pointed out for the differentiation of the rhizomes and roots of domestic Veratrum (*Veratrum viride*) and imported Veratrum (*Veratrum album*). These results are interesting in view of the belief generally expressed in textbooks and recent articles that differentiation is not possible.

2. Means are also pointed out for the differentiation of *Veratrum californicum*, another native form, hitherto not studied histologically.

3. The main differentiating characteristics found in the rhizome and roots of *Veratrum album*, *Veratrum viride* and *Veratrum californicum* were those of the endodermal cells forming in the case of the rhizome and root a sheath, the cells of which show different thickenings of the inner tangential and radial walls. Also, the calcium oxalate raphide bundles occurring in both rhizome and root were found to be more or less characteristic, differing in length in the different species. Calcium oxalate raphides occurring in the leaf scales attached to the rhizomes of *Veratrum viride* and *Veratrum album* were found to be distinctly longer than those in the rhizomes and roots of these species. The epidermal cells of

the roots showed sizes which were also different, being smallest in the case of *Veratrum viride*, larger in *album*, and still larger in *californicum*.

It has been evident during the course of this investigation that these characteristics vary to a considerable degree, even showing a tendency to overlap in single instances, thus demonstrating the close relationship of the forms under consideration. The analyst, in doubtful cases, should be aware of this fact and not confine himself to one single character nor to one specimen in arriving at a conclusion.

4. The present market quotations indicate that *Veratrum album* and *Veratrum viride* are considered of equal value.

5. No data, however, as to the relative value of *Veratrum viride* and *Veratrum album*, definitely identified as such, appear to be available. The means we have pointed out for their histological differentiation should permit of comparative studies of the plants as found in the market and as a result of such studies establish their relative values as therapeutic agents and as insecticides.

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HALPHEN'S TEST IMPROVED.

BY R. A. KUEVER.

Halphen's colorimetric test for cottonseed oil, according to Raikow, depends upon an unsaturated fatty acid which combines with sulphur, forming a wine-colored compound. It is the test of the United States Pharmacopoeia for the detection of cottonseed in olive oil. The procedure of the official test is as follows:

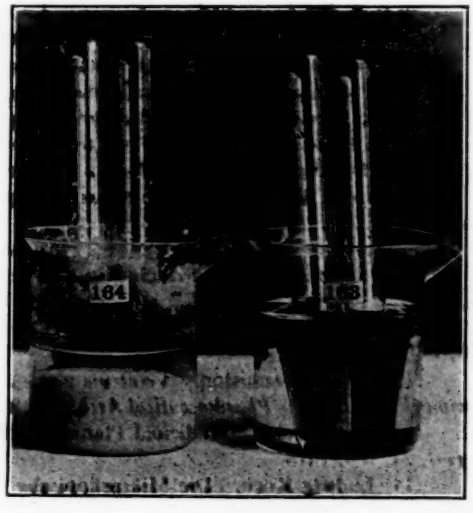
> Mix 5 mils of the oil in a test tube with 5 mils of a mixture of equal volumes of amyl alcohol and carbon disulphide, which contains 1 percent of sulphur in solution, and immerse the test tube to one-third its depth in boiling, aqueous salt solution; no reddish color develops in fifteen minutes (cottonseed oil).

This test is not entirely satisfactory for several reasons. The Halphen reagent is not stable because the sulphur soon crystallizes after which the activity of the reagent is seriously impaired. The test is not sufficiently sensitive nor is it entirely dependable. The brine bath is unsatisfactory insofar that it sputters and crystallizes out salt as is shown in the photograph below.

Moreover, the temperature of a brine bath is not sufficiently high (106° C.) to bring out the color in the shortest possible time. It has been determined that a temperature as high as 175° C. does not interfere with the color formation.

Neither the reagent nor the procedure of the official test is entirely satisfactory and the following changes are proposed to overcome some of the difficulties. As a reagent the following has been found much more sensitive and permanent:

Carbon disulphide	100 mils
Pyridine	100 mils
Sulphur	2 Gm.



The above photograph shows the color and absence of color as produced by the improved Halphen's reagent. In each beaker the left-hand tube contains equal parts of pure olive oil and reagent, while the right-hand tube contains the same mixture excepting that the olive oil has previously been adulterated with ten percent of cottonseed oil. Beaker No. 164 shows the use of a brine bath at 106° C. in which the color did not fully develop for an hour. Beaker No. 163 shows the proposed hydrocarbon oil bath at 115° C. in which the color was completely developed almost instantly.

The pyridine and carbon disulphide are mixed and the sulphur, under a reflux, is dissolved by the aid of gentle heat.

The procedure may advantageously be changed by substituting for the brine bath a hydrocarbon oil bath and heating it to 115° C. before the tubes containing the suspected oil and reagent are immersed. If cottonseed oil is present the wine coloration will develop almost instantly.

This test is sensitive to one percent. If olive oil has been adulterated with as little as one percent of cottonseed oil, it may be detected by this method.

Pharmacists have successfully utilized this colorimetric test in their window displays of olive oil—one piece of apparatus showing a negative test on the brand of oil on display while another exhibited a positive test on some spurious brand. Since the heat may be removed a few minutes after the tubes are placed in the hydrocarbon oil, this apparatus lends itself well for window display purposes. The color is quite permanent. No change is perceptible in months.

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PEPSIN—METHODS USED FOR ITS QUANTITATIVE ESTIMATION—ITS PERMANENCE AND EFFECTIVENESS IN SOME OF ITS PREPARATIONS.*

BY H. W. VAHLTEICH† AND C. C. GLOVER.

The oldest accurate and carefully recorded and carrie dout methods[1] for the quantitative estimation of pepsin, are those described by Bidde and Schmidt[3] in 1852. In the three-fourths of a century since, progress has been made in the quantitative estimation of the activity of this ferment, but it has been a progress in the art of manipulation and in the improvement of mechanical devices used rather than an advance in the understanding of the exact mechanism of the reactions involved in the process. Since the official or U. S. P. IX method for the quantitative estimation of pepsin has brought forth much criticism and many suggestions for its improvement, it was thought that time might well be spent in a study of the processes in an endeavor to improve the present method of assay. The older methods will be discussed more briefly and then a report of our success with them and also with the more recent ones suggested in the literature will be taken up.

At least two[1 & 2] excellent and comprehensive critical reviews of pepsin assay methods are to be found in the literature. Neither of these includes discussions of the more recent edestin methods (Fuld's and Brewster's), the recent modification of the electrolytic method[9] suggested by Northrup[20] or of the U. S. P. IX method and its development. Any method which requires more time for preparation and carrying out than the U. S. P. IX method does, with no advantage over it as to accuracy or reliability, need not be considered. This eliminates the Mett method which requires from twelve to twenty-four hours, Volhard's casein precipitation method which Geselschap[23] characterizes as "cumbersome and not particularly reliable," and the former U. S. P. method which required six hours for complete digestion. The Grützner and other colorimetric methods are not nearly as accurate as the U. S. P. IX method. With the Grützner carmine-fibrin method we have been able to detect only a 6 : 5 relationship between two solutions actually having a 2 : 1 relationship by the official test.

All the methods of the Jacoby, Solms, Fuld, Brewster "soluble protein" type

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* The authors wish to express sincere thanks to the many pepsin manufacturers who by their kind coöperation have aided in this investigation.

† Work done as holder of Stearns Fellowship for 1920–21, in partial fulfillment of the requirements for the Degree of Master of Science.

are open to the same difficulty, namely, that of obtaining a sharp end-point. Edestin offers the advantages over ricin of being non-poisonous and forming a clear solution in $\frac{N}{12}$ HCl. The pepsin assay method in which it is used is carried out somewhat differently by Brewster[21] than by Fuld.[14] The latter directs the preparation of four solutions: A, Normal 0.033 HCl; B, 0.1% solution of edestin in Normal 0.033 HCl; C, a standard pepsin solution; and D, 10% sodium chloride solution. Ten small test tubes containing from 0.1 to 1.0 Cc., inclusive, each of solution B and corresponding amounts of A to produce a constant amount of liquid are kept 30 minutes at room temperature and then 1 Cc. of the 10% NaCl solution added. If the strength of pepsin has been properly adjusted some of the tubes will be clear and some cloudy, the latter being due to the precipitate of unpeptonized edestin. It is, however, practically impossible to determine where turbidity ceases, even under the best of light conditions, and insofar as the minimum variation due to inability to discern cloudiness is 10%, it is quite evident that the method is far from being comparable to the U. S. P. method which permits of detection of a 3% discrepancy.

In the Brewster[21] modification a somewhat different procedure is used. Here the edestin is precipitated by a 10% sodium chloride solution and the agglutinated mass is digested by the pepsin—a process essentially different from the Fuld modification in that it may be classed, with the action of pepsin or coagulated egg albumen as in the U. S. P. IX method, as a typical peptonization process in which the dispersity of the precipitate is increased and (peptization) which involves surface tension and adsorption phenomena, while in the Fuld modification we have a reaction taking place in solution, a peptonization.

We carried out the method as outlined by Brewster in his article using two different pepsins, but so diluted in solution that each liquid contained the equivalent of 1 Gm. of 1 : 3000 pepsin per 100 Cc. The bath was kept at 37.3° C. to 37.5° C. The results obtained were as follows:

TABLE I.

Tube Nos.		1	2	3	4	5	6
1% Edestin	Cc.	0.25	0.50	0.75	1.00	1.00	1.00
$\frac{N}{10}$ HCl	Cc.	0.75	0.50	0.25	0.00	0.00	0.00
10% NaCl	Cc.	1.00	1.00	1.00	1.00	1.00	1.00
1% Pepsin	Cc.	1.00	1.00	1.00	1.00	1.00	1.00
		TIME ELAPSED IN MINUTES.					
Pepsin No. 1		5.0	17	26	44	44	Undissolved
Pepsin No. 2		5.5	22	40	46	Undissolved	43

Thus in tubes No. I there is a difference of 10%, where there should be equality; in tubes No. 2 a difference of $\frac{22-17}{17}=\frac{5}{17}=29.4\%$, in tubes No. 3 a difference of $\frac{40-26}{26}=\frac{14}{26}=55\%$, and practically no difference in the 6 tubes (3 for each pepsin) containing equal quantities of all materials. It will be noticed, however, that 2 of these were totally useless for purposes of a comparison because the edestin had clumped so badly that it remained insoluble indefinitely. This clumping is not a very infrequent occurrence in our experience.

TABLE II—USING 0.1 CC. INCREMENTS AND DECREMENTS.

Tube Nos.	1	2	3	4	5	6	7	8	9	10
1% Edestin	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
$\frac{N}{10}$ HCl Cc.	0.9	0.8	0.7	0.6	0.5	0.4	0.3	0.2	0.1	0.0
10% NaCl Cc.	1.0	throughout								
1% Pepsin Cc.	1.0	throughout								
	TIME ELAPSED IN MINUTES.									
Pepsin No. 1	3.5	6.0	6.5	8.5	12	15	20	28	43	45
Pepsin No. 2	5.0	10.0	9.0	8.0	23	23	35	44	44	63

From Table II it will be seen that the discrepancies referred to above are still larger than in Table I, since in either case solutions of identical peptic value were used throughout, and equal results should be expected. We find it very difficult to determine just when all the precipitate has dissolved and that the time required for solution varies not only with different operators, but with the same operator at different times. In tubes Nos. 8, 9 and 10 this discrepancy may amount to from 5 to 10 minutes. Our results lead us to believe that this method cannot be relied upon as an assay method for pepsin, even as a rapid comparison method using a pepsin standardized by the U. S. P. IX method as a control or standard of comparison, and of course not to replace the present official method.

Pepsin, like rennin, has the power of curdling fresh cows' milk. It will curdle milk with a rapidity proportional to the amount of pepsin present, but though it is possible to distinguish between pepsins related in proteolytic power in the ratio of 3 : 4 or sometimes even 4 : 5 by this method, it is not very reliable and not capable of greater delicacy.

We have also tried out the method recently outlined in detail by Northrup[20] and suggested by M. Oker-Blom[9] about twenty years ago. It is based on the fact that as pepsin and egg albumen interact in a solution the electrical conductivity of the latter changes in proportion to the amount of proteolysis taking place, that is, in such a determination the change in resistance divided by the time in minutes required to produce the change should give a factor directly proportional to the activity of the pepsin and amount of it used.

Our procedure was as follows (Bath adjusted to $37° \pm 0.05°$): The set-up did not include the Vreeland oscillator as suggested in Taylor and Acree's paper referred to by Northrup, but was the ordinary whetstone bridge set-up used in conductivity work, with microphone hummer and telephone. Into the conductivity cells were placed 25 Cc. portions of a 3% solution of egg albumen, and the liquid permitted to take the temperature of the bath. Then 2 Cc., 3 Cc. and 4 Cc. portions of a pepsin solution were added to the separate cells, and bridge readings taken with resistance adjusted to give middle of the bridge readings. The time of each reading was noted, and a table such as the following made out:

TABLE III.

Time.	Bridge reading.	Bridge reading difference.	Time difference.
3.34	.5015		
3.38	.5000	15	4
3.43	.4960	55	9
3.50	.4895	120	16
4.05	.4845	170	31

TABLE III (*continued*).

Time.	Bridge reading.	Bridge reading difference.	Time difference
4.15	.4805	210	41
4.24	.4790	225	50

$$\text{Factor} = \frac{225}{50} = 4.50$$

TABLE IV.

Time.	Bridge reading.	Bridge reading difference.	Time difference.
3.41	.5060		
3.46	.5050	10	5
3.55	.5000	60	14
4.02	.4965	95	21
4.11	.4935	125	30
4.19	.4900	160	38
4.29	.4875	185	48
4.46	.4835	225	65

$$\text{Factor} = \frac{225}{65} = 3.46$$

TABLE V.

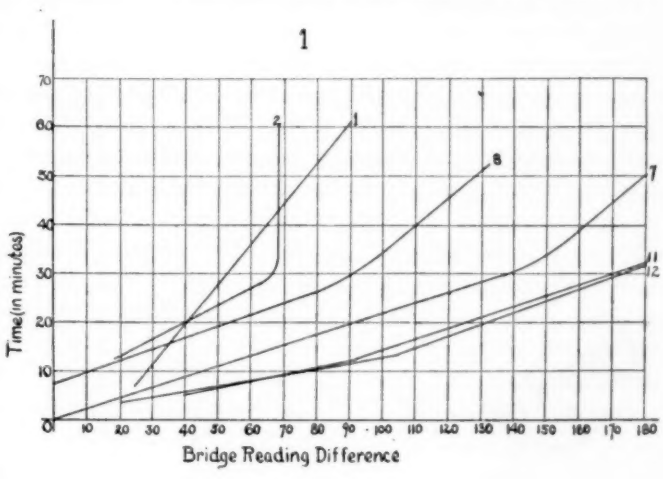
4.34	.5015		
4.40	.4985	30	6
4.43	.4960	55	9
4.48	.4930	85	14
4.54	.4900	115	20
5.25	.4800	215	51

$$\text{Factor} = \frac{215}{51} = 4.21$$

It will be noticed that the relationship of the factors obtained in Table III and Table IV is 3.46 : 4.50 or quite close to 3:4, the relationship of the amounts of pepsin used, but that the factor of Table 5 which should be about 2.25, because only 2 Cc. of pepsin solution was used, is 4.21. On two trials carried out identically where the relation should have approximated 1:1, we obtained a 4.37 : 4.41 relation, a very creditable result. An attempt to repeat this 1:1 relation in another test gave the relation 3.44 : 3.85, and in another case 2.95 : 3.43. Such results are typical of the many we obtained, so that while the method does sometimes give the true relationship existing it can by no means be relied upon. One feature of the method for which we have no practical use possibly at present, is the means it gives us of watching the rate of change taking place during the peptonization. By plotting the bridge reading difference against the time elapsed (column 3 against column 4 of the tables) we get a graphic representation of the progress of the reaction. (Chart I.) As Northrup points out the ideal curve is one approximating a straight line but we have not found this type of curve recurring with any great regularity. The accompanying graph shows some curves obtained.

Curves Nos. 1 and 2 were obtained from two identical samples, their factors are 1.47 and 1.11, respectively, and the curves are quite evidently not superimposable. Similarly 7 and 8 are from identical samples and although more concordant than

1 and 2 are also not superimposable. Curves 11 and 12 also are from identical samples and almost superimposable. Their factors are 4.4 and 4.7, respectively.



It was thought that by using a purified substitute in place of ordinary egg albumen considerable of the irregularity of the experiment might be eliminated, but the use of both edestin and purified egg albumen[29] showed no improvement over the use of ordinary egg albumen. It seems that the fundamental difficulty will not be eliminated until we thoroughly understand the "biologic" factor in the action of pepsin.

The official U. S. P. test seems to be a purely American method. We have not been able to find mention of it in the English or German literature. Its earliest forerunner seems to have been the "Manwaring" test introduced into the U. S. P. in 1890. The time of digestion was six hours and a 1:3000 pepsin was one which digested 3000 times its weight of freshly coagulated and disintegrated egg albumen in that time at 37° C. It was later discovered by Petit that the optimum temperature for pepsin digestion is about 50° C. and investigation of the constancy of egg albumen brought out that seemingly the albumen of eggs between 5 and 12 days old or more especially 5 to 7 days old[28] is less unconstant than that of eggs of other ages, so that these standards have found their way into the process.

In an effort to determine the variation in moisture content of the coagulated albumen of eggs of various ages with the intention of ascertaining the relation, if possible, between the ease of digestion and moisture content, we carried out about 200 moisture determinations (desiccated at 55–57° C.) on the albumen which was used in our assays, with using eggs from 1 day to 20 days old, and also storage eggs. Our results would indicate that the moisture content of the former is irregular and not at all constant, while that of storage eggs may often be a little less than that of the one to twenty day old eggs. On the other hand, the average storage egg albumen seems more easily digestible than that of a 5 to 12 day old egg, while that from eggs less than 5 days old often leaves noticeably large residues by the official method, that is, it is less easily digestible.

The especially designed, tapered, graduated sedimentation tube and the two and one-half hour time limit with 1 Cc. albumen residue are the later improvements of the method. Various suggestions have been made to standardize and make the method uniform, such as the official method of disintegrating the sieved albumen with a rubber-tipped glass rod, and more recently, the suggestion of

pounding a bottle containing the albumen a given number of times on a suitable pad. One excellent means of producing a uniformly disintegrated albumen mass is to pass the albumen through a No. 80 sieve after having first passed it through a No. 40 sieve, and to use a heavy (1 Cm.) glass rod with flattened end to produce disintegration. The resulting mixture (after the gradual addition of 0.3% HCl) contains the albumen more uniformly and highly dispersed and like an emulsion, than when it is run through a No. 40 sieve only. It is never lumpy and always uniform, although, of course, it requires additional labor. As far as we have been able to observe, the use of this modification does not produce either more rapid or more complete digestion although undoubtedly a much greater surface of albumen is subjected to the action of the pepsin. Evidently other more important factors than that of surface are involved. We find that passing the albumen through a No. 40 sieve is sufficient, but believe the flattened heavy glass rod superior to the rubber-tipped rod of the U. S. P. IX for disintegration. In order to obtain uniformity of results in such an assay method as this, it is of the greatest importance that a uniform technic be adhered to throughout.

The official method has been much criticized, usually for one or more of the following reasons:

1. Results obtained by it are not always consistent and reliable.
2. To obtain eggs of the specified age is a decided objection and a handicap to the method.
3. The method is too long and cumbersome.

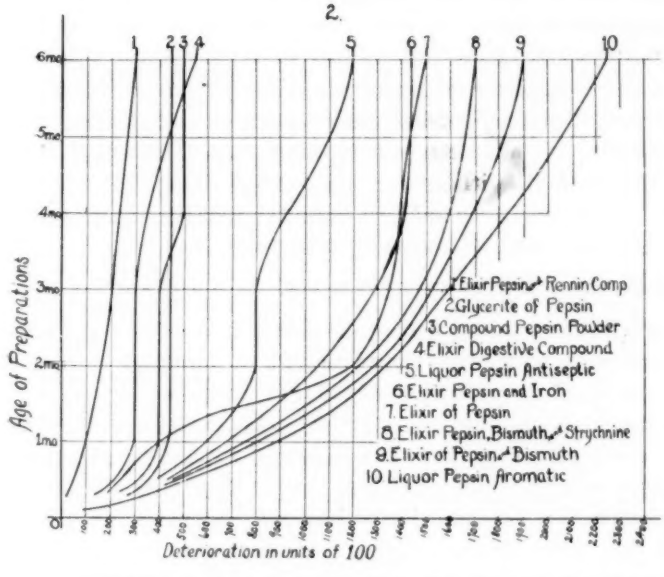
These criticisms will be discussed in this order.

We have found a method of procedure with the test which has given us reliable and consistent results, to be as follows: For pepsin in any form dissolve 0.1 Gm. in 150 Cc. $\frac{N}{12}$ HCl as the U. S. P. IX directs. Of this add 5.00 Cc. to the egg albumen prepared in the usual manner and suspended in $\frac{N}{12}$ HCl (it is assumed that the pepsin tests in the neighborhood of 1:3000, if not, preliminary tests covering the suspected range must first be run) and proceed in the usual manner (U. S. P. IX). Run six or more of such identical bottles side by side in the same bath. As a rule, after setting out in the sedimentation tubes, the amount of albumen residue varies anywhere from 0.5 to 2.0 or even 3.0 Cc. If six tubes are run discard those showing non-concordant residues, add up all the others and divide by their number. If this gives an average residue between 1.00 and 1.25 Cc. we would call the pepsin 1:3000. If the residue runs higher than 1.25 Cc. we would repeat with another six tubes at 1:2800 or 1:2900 as the amount of residue indicated, and if lower, at 1:3100, etc. A single determination showing a 1.00 Cc. residue really means nothing and two such but little more, and only if four or more tubes show 1.00 Cc. each of residue (a very unusual check) would we be willing to say a pepsin was of the value indicated by the strength run which gave these four checks. We believe it to be much more rapid and equally sure, to use the method of "Averages" outlined above. It has given excellent and consistent results.

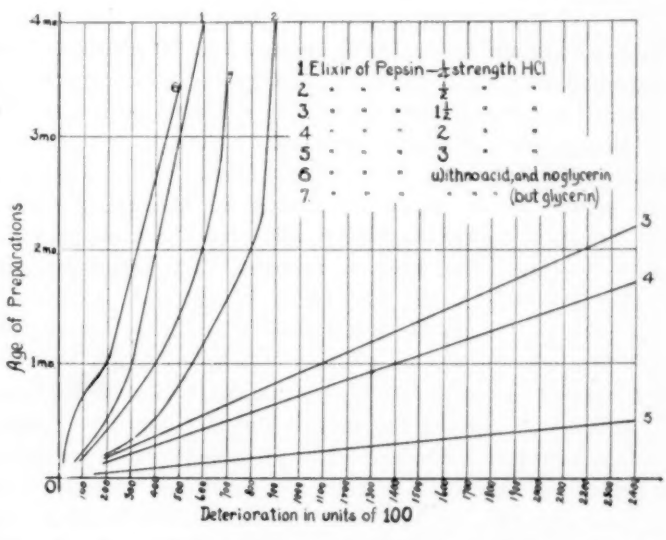
A pepsin manufacturer called to our attention a comparative method which we have found to give good results and which obviates the necessity of continuous use of 5 to 12 day old eggs. It is first necessary to establish a "known" or standard pepsin of a convenient strength, let us say, 1:3000, by running a considerable

number of tests on it with fresh eggs by the official method. This is then used as a control when using albumen from ordinary storage eggs (as good a quality as is obtainable is used). Three to five control tubes containing the known 1: 3000 pepsin are placed at intervals throughout the bath and the average albumen residue left by them is used as a basis for calculating the value of the unknowns in the bath. Let us say the residue in the 1: 3000 standard averages 1.80 Cc. Then, if that of the unknowns averages the same or less they too are 1: 3000 or better, respectively. For example, in one test we ran two different known pepsins each close to 1: 3000, ten bottles each. The mean of the lowest seven residues was in one case 1.97 Cc. and in the other 1.83 Cc., a discrepancy of but 0.14 Cc., easily attributable to a slight difference in strength. This method, then, offers one means of solving the fresh egg difficulty, partially at least. We have also been working with commercial powdered egg albumen with the intention of preparing it for use in place of the albumen of storage eggs in this comparative method. If used in this manner it would not be necessary to standardize the commercial albumen in any way, nor would it matter if it varied in nature due to differences in source, because the method is purely comparative. We will have to await a later date for publication of more complete results on this work.

2.


Age of Preparations
Deterioration in units of 100
1 Elixir Pepsin-Rennin Comp
2 Glycerite of Pepsin
3 Compound Pepsin Powder
4 Elixir Digestive Compound
5 Liquor Pepsin Antiseptic
6 Elixir Pepsin and Iron
7 Elixir of Pepsin
8 Elixir Pepsin, Bismuth, Strychnine
9 Elixir of Pepsin-Bismuth
10 Liquor Pepsin Aromatic

3


Age of Preparations
Deterioration in units of 100
1 Elixir of Pepsin—½ strength HCl
2 " " " ¾ " "
3 " " " 1½ " "
4 " " " 2 " "
5 " " " 3 " "
6 " " " without acid, and no glycerin
7 " " " " " (but glycerin)

That the U. S. P. IX method is time-consuming and cumbersome there is no doubt. It has been suggested that the amount of albumen residue at the end of the test be increased and the time reduced from two and one-half hours to two or even one and one-half hours. There is a decided objection to this. The pepsin and albumen do not interact with the mathematical regularity and velocity of acid and alkali or oxidizing and reducing agents. Sometimes they react rapidly immediately after mixing, again it may take an hour or more before very vigorous action sets in. Hence the longer the time of the test the more chance for complete reaction and accurate results. Two and one-half hours seems to be a satisfactory length of time for good results. It has been our experience that two men, well versed in the technic of the method, without any mechanical device for turning bottles can easily run fifty to sixty bottles in an eight hour day. With a mechanical inverter they would have two and one-half hours for other work.

MEDICINAL PEPSIN PREPARATIONS.

The accompanying graphs Nos. 2 and 3 contain a list of some of the liquid and powder pepsin preparations which we have assayed at monthly intervals for several months with the total deterioration which they have shown. It will be noticed that all these preparations show more or less deterioration after being made up. We have also assayed a considerable number of similar preparations put on the market by various manufacturers, and find that in them, too, deterioration takes place. Our observation of these latter has only extended over four months, so that although they have shown somewhat less deterioration than the corresponding ones of our own, manufactured according to official formulas, they show no exception to the rule that the preparations of pepsin in general use for medicinal purposes do deteriorate considerably after manufacture.

Perusal of literature reveals a long list of substances which inhibit peptic activity. Aromatics and antiseptics of coal-tar origin are prominent among these. Corresponding to this our chart shows that Aromatic Solution of Pepsin N. F. IV, manufactured with enough 1:3000 pepsin to have assayed 1:3000 after manufacture, had dropped to 1:1000 after seven months, or a loss of 1:2000. The bismuth and iron (heavy metal) preparations show a similar deterioration. Elixir of Pepsin also contains aromatics, though in rather small quantities, and likewise the Antiseptic Solution of Pepsin. Elixir Digestive Compound N. F. III, the source of so much discussion in the past, shows comparatively little deterioration in peptic activity, although the same preparation lost seven-eighths of its diastasic value in three months. The other three preparations, Compound Pepsin Powder, N. F. III, Elixir Pepsin and Rennin Compound N. F. IV and Glycerite of Pepsin N. F. IV showed the least deterioration.

Just why pepsin in solution should gradually lose its activity, while in the dry forms it is comparatively permanent, it is quite impossible to answer definitely. E. Buchner,[25] toward the end of the last century, pointed out that cane sugar was an inhibitant, which may be an important factor here, for considerable sugar is present in almost all of these preparations. Pepsin in its dry forms, as scales, granulations, etc., we have found to be fairly permanent, losing very little activity over a period of years. Considerable difficulty is had by manufacturers of pepsin, however, because of the claims of the chemists that their pepsin is 100 to 200 or more

units below the labeled strength. This may, in the opinion of the authors, often be due to moisture taken up by the product when left in an unstoppered container. Pepsin is hygroscopic. We have found that the average samples of dry pepsin lose from 8 to 10% of their weight when kept in a desiccator over sulphuric acid for a month. This loss corresponds to a 1:300 loss in activity on a 1:3000 pepsin.

The question of proper acidity of pepsin preparations has always been a much-discussed one. It has been definitely established that pepsin cannot act in an alkaline medium. Schütz[26] has shown that free hydrochloric acid is not absolutely indispensable to peptic digestion and also that an energetic peptic digestion can take place with a noticeable hydrochloric acid deficit. We have it from such authorities as Hawk, Effront-Prescott, and Mathews that the strength of hydrochloric acid varies with: (1) The types of pepsin, that is, a certain concentration which may be optimum for pepsin from a hog's stomach is not so for that from a dog's or calf's stomach. (2) It varies with the protein acted upon, for example, 0.08 to 0.10 percent for fibrin and 0.25 percent for coagulated egg white (Hawk). Other figures are given by Effront.[27] (3) It varies with the degree of coagulation of the albumen.[27] Hence there cannot be such a thing as a *constant* optimum hydrogen ion concentration even for the same pepsin, also that the U. S. P. directions regarding the length of time for boiling the eggs is to be followed to the letter. In order to determine the keeping qualities of various preparations differing from the official Elixir of Pepsin in acidity and glycerin content only we made up those enumerated on Chart 3, beginning with an Elixir Pepsin containing only one-fourth of the quantity of hydrochloric acid of the official preparation. From our tabulated results, it would seem that this first preparation at the end of four months has more superior keeping qualities regarding its peptic activity than the official preparation containing four times as much acid, although we are not as yet able to say how rapid the deterioration will be from this point on.

In assaying any of these preparations a quantity of the preparation was taken which represented 0.1 Gm. of 1:3000 pepsin and sufficient $\frac{N}{12}$ hydrochloric acid was added to it to make 150 Cc., just as directed in the official method for pepsin in the dry form. 5 Cc. of this liquid should leave a 1 Cc. residue at the end of the process. Similarly, if run at 1:2900 we would use 5.17 Cc., at 1 : 2800 5.35 Cc., etc.

With the bismuth preparations a difficulty is encountered upon diluting 11.8 Cc. of either of the bismuth elixirs to 150 Cc. with $\frac{N}{12}$ hydrochloric acid in that a white precipitate of a basic bismuth compound is obtained. To assay the preparation one has the choice of three methods: (1) to shake it up and pipette off a portion, precipitate and all; (2) to filter and use the clear liquid only; (3) to just dissolve the precipitate by the cautious addition of 30% HCl. The first two methods give very irregular results, often hardly any albumen being dissolved at all; the last method is quite satisfactory though at times it seems that upon addition of the mixture to the albumen, when ready for digestion, the bismuth causes trouble again and we get a somewhat cloudy mixture, which seemingly, however, does not interfere with the test. Naturally an objection to this procedure presents itself in that, after the addition of concentrated HCl as suggested,

it would be expected that the resulting liquid would be far above the optimum in acidity for peptic digestion. In order to determine just how acid the resulting liquid was, that is, 11.8 Cc. Elixir Pepsin and Bismuth and 138.0 Cc. $\frac{N}{12}$ HCl plus a sufficient number of drops of concentrated HCl (usually 8 to 10 drops or 0.5 Cc. are sufficient), we titrated several such portions with $\frac{N}{12}$ KOH, using phenolphthalein as indicator. The mixture always required between 175 Cc. and 190 Cc. of $\frac{N}{12}$ KOH, while it should have required about 150 Cc. $\frac{N}{12}$ KOH, giving an acidity of about 0.35% HCl instead of about 0.30%. Now it must be remembered that only about 5 to 10 Cc. of this 0.35% HCl liquid are used in the assay and are added to about 35 Cc. of the $\frac{N}{12}$ HCl used to suspend the albumen, so that finally the pepsin in the digestion mixture is acting in a medium containing quite close to 0.30% HCl.

It also occurred to us to use distilled water instead of $\frac{N}{12}$ HCl to dilute the 11.8 Cc. of elixir to 150 Cc., for then no precipitate is obtained. Then a portion of this clear liquid is used. We have found that this procedure gives a larger number of cloudy mixtures when we get ready to set the digestion mixture out in the sedimentation tubes, and that the results are not as concordant as with the method suggested above where concentrated HCl is used. This is possibly due to a precipitation of the bismuth compound upon addition of the liquid to the digestion mixture and subsequent interference with the action of the pepsin by occlusion or some similar phenomena, or possibly to a too low acidity, because here the diluted pepsin preparation is very low indeed in acidity since water was used for dilution instead of $\frac{N}{12}$ HCl.

Besides the sample of Elixir Pepsin and Bismuth made up for assay over a period of months, we also made up two other separate samples, one of which, No. 1, was assayed on the seventh and eighth days after making; the other, No. 2, was assayed a sufficient number of times within the twenty-four hours immediately after it had been prepared to determine its strength. No. 1 (older sample) assayed 1: 2700 after eight days, and No. 2 assayed 1: 2800 within three hours after it was made up. As an example of the basis for our conclusions on figures obtained we submit the following Table VI.

TABLE VI.

Date.	No. of bottle.	Name of preparation.	Strength run.	Cc. of preparation used.	Albumen residue.	Remarks.
6/9/21	1	Elixir Pepsin and Bismuth	1:3000	5.00	1.70	clear
	2	of 6.2.21	1:2750	5.45	1.20	clear
	3		1:2500	6.00	0.80	clear
	4		1:2250	6.67	0.25	clear
6/10/21	2	same	1:2500	6.00	0.80	clear
	10		1:2500	6.00	0.70	clear
	11		1:2500	6.00	1.00	cloudy
	12		1:2500	6.00	0.60	clear
6/11/21	2	same	1:2700	5.55	0.95	clear
	7		1:2700	5.55	1.00	clear
	8		1:2700	5.55	0.95	clear
	9		1:2800	5.35	1.60	clear
	10		1:2800	5.35	1.70	clear

We should consider such results sufficient evidence for saying that this preparation on the last date given ran approximately 1:2700 and insofar as we were sure that the amount of scale pepsin used in its manufacture should have required it to assay about 1:3000 under these same conditions, we should say that a 10% loss in peptic value had occurred in the preparation in about one week's time.

Similarly the fresh preparation, No. 2 mentioned above, showed that the loss in peptic activity in this combination was 1/15 or about 6 $^{2}/_{3}$% immediately after making.

Finally, regarding our experience with the two pepsin-bismuth elixirs of the N. F. IV which were assayed over a period of seven months we found, as our chart No. 2 shows, that both preparations lost about 67% of their peptic value in seven months.

CONCLUSIONS AND SUMMARY.

1. The U. S. P. IX assay method for pepsin is both the most rapid and most reliable method at our command, and the edestin method (and its type using ricin, pea globulin and similar proteids) and conductivity methods are not reliable enough to supplant it.

2. The storage-egg modification of the official method is a reliable modification.

3. We have suggested a method for overcoming a difficulty in the assay of pepsin preparations containing bismuth.

4. From our results, showing deterioration in peptic value of manufactured pepsin preparations, we conclude that it would be to the manufacturers' advantage to strongly fortify such preparations with pepsin in considerable excess of the value as declared on the label.

5. That the moisture content of egg albumen is quite independent of the age of the egg and that ease of digestion of the albumen must be dependent on other factors.

6. A "standard" or "control" pepsin should be kept in containers (air-tight) of such a size that their contents will be completely dispensed before having taken up any considerable amount of atmospheric moisture.

7. We would suggest that the pepsin preparations containing bismuth, iron, aromatics, or antiseptics in the proportions found in the above official preparations be extemporaneously prepared only, and that it should not be expected that they retain their peptic activity as long as the other preparations.

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MODIFIED METHOD FOR DETERMINATION OF BISMUTH IN MAGMA BISMUTHI—BISMUTH MAGMA—MILK OF BISMUTH U. S. P. IX.

BY M. CRANE AND E. C. MERRILL.

Milk of Bismuth, U. S. P. IX, pages 260 and 261, calls for an assay requirement under the following method:

Assay—Evaporate to dryness about 10 Gm. of Bismuth Magma, accurately weighed, and ignite the residue to constant weight; the residue corresponds to not less than 5.6 percent nor more than 6.2 percent of the weight of Bismuth Magma taken.

This method of assay may be modified by use of Gooch method, by means of which speed of assay may be increased without affecting in any respect the accuracy of the determination. Such method is as follows:

Prepare a Gooch crucible in the regular manner, and place inside of a regular porcelain crucible, about size O. Dry and weigh both together. Pour about 20 Gm. of Magma into the Gooch and weigh again. Put the Gooch on a suction funnel and filter out the water. Then place Gooch on a pipe-stem triangle and heat up slowly. Finish at full heat of Bunsen. Cool in desiccator and weigh with regular crucible, which has been dried in the meantime.

The object of using the additional crucible is to hold the water that drains through the Gooch while weighing. This method cuts the time of assay to about one-third of the time required by the U. S. P. method and at the same time checks it.

Results given as follows:

Gooch method.		U. S. P. method.	
Gooch + Crucible + Magma	43.8408	Crucible + Magma	18.3955
Gooch + Crucible	23.7545	Crucible	8.3230
Weight taken	20.0863	Weight taken	10.0725
Gooch + Crucible + Bi_2O_3	24.9273	Crucible + Bi_2O_3	8.9090
Gooch + Crucible	23.7545	Crucible	8.3230
Bi_2B_3	1.1728	Bi_2O_3	0.5860
	5.85%		5.83%

An additional advantage that this method has is that the washings from the Gooch left in suction flask may be utilized for test for neutrality and absence from nitrates or other impurities.

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NOTES ON ASH YIELD OF GLYCYRRHIZA.

BY C. H. ROGERS AND E. L. NEWCOMB.

A series of samples of powdered Glycyrrhiza were first examined, total and acid-insoluble ash determinations being made. Following this, samples of Glycyrrhiza from different sources were prepared by submitting to various cleaning processes, then powdered and ashed.

A study of the results obtained showed that one sample, No. 3, exhibited a higher acid-insoluble ash than the total ash of clean samples. The soluble ash was also excessive for reasonably clean Glycyrrhiza. On microscopic examination, the sample proved to be largely Senna. Sulphur was not present. Apparently a pure case of accidental labeling.

The several cleaning processes used are described briefly in the table as this will enable a more ready comparison with the methods employed and the results.

Sample No.	Source of sample and remarks.	Percent total ash.	Percent ash insoluble in 5% HCl.
1.	Commercial, No. 60 Powder	5.18	1.12
		5.31	1.15
2.	Commercial, No. 60 Powder	3.31	0.46
		3.42	0.92
		3.71	0.819
		3.45	0.45
3.	Commercial, No. 60 Powder	12.14	4.14
		12.08	4.21
4.	Commercial, No. 60 Powder	6.79	3.19
		6.78	3.22
5.	Commercial, No. 60 Powder	7.13	3.19
		7.17	3.26
6.	Commercial, No. 80 Powder labeled "Spanish 1918, ash 10.25"	5.09	1.51
		5.20	1.73
7.	Commercial, No. 80 Powder labeled "Russian 1918"	3.75	0.39
		3.77	0.53
8.	Commercial, Powdered, Spanish, 1920	3.63	0.47
		3.64	0.85
9.	Commercial, Whole, Spanish, garbled to remove stems, powdered, University of Minnesota	4.84	1.25
		4.85	1.37
10.	Commercial, Whole, Spanish, garbled to remove stems, powdered, University of Minnesota	4.13	0.77
		4.24	0.84

Sample No.	Source of sample and remarks.	Percent total ash.	Percent ash insoluble in 5% HCl.
11.	Commercial, Overground stems only, cleaned by brushing dry. The stems represented with dirt 12.5 percent of a 13.5 Kg. lot and were tasteless	2.66	0.81
		2.63	0.63
12.	Commercial, Quality A, whole, all *roots* brushed dry, scrubbed wet, 1–2 Cm. diameter, powdered, light and spongy	2.79	0.171
	(Identified as *Glycyrrhiza uralensis*)	2.80	0.22
13.	Commercial, Italian, rhizome and roots brushed dry, scrubbed wet, dried and powdered, No. 20	4.95	0.38
		5.01	0.45
14.	Commercial, Spanish, from small bundle brushed dry, scrubbed wet, dried and powdered, No. 20	3.49	0.20
		3.45	0.146
15.	Commercial, Quality B, small stolons, brushed dry and powdered, somewhat reddish in color, like No. 12	3.90	1.04
	(Identified as *Glycyrrhiza uralensis*)	3.84	0.73
16.	Commercial, Select No. 80 powder, 1920	5.44	1.26
		5.48	1.34
17.	Commercial, Powdered, bought in 1920	4.70	1.00
		4.69	0.98
18.	Commercial, Powdered, bought in 1920	6.06	1.37
		6.08	0.91
19.	Commercial, Powdered, bought in 1920	6.11	0.98
		6.10	1.39
20.	Commercial, Cut Licorice, powdered, No. 60 in laboratory	4.44	0.47
		4.44	0.41
21.	Commercial, Siftings from machine cleaning process applied to small bundle, Spanish, bought in 1920	33.67	18.57
		34.09	18.74
		32.91	17.81
		34.30	19.33
22.	Commercial, Small bundle Spanish, dried at 150° F. in oven 24 hours, lost 7.47 percent, shaken on No. 20 wire screen in gyrator 12 minutes, loss of siftings 2.51 percent (see No. 21 above), powdered in laboratory	3.38	0.37
		3.93	0.73
		3.92	0.47
		4.25	0.41
23.	Commercial, Persian, brushed dry, scrubbed wet, dried and powdered	5.63	0.52
	(Identified as *Glycyrrhiza echinata*)	5.57	0.36
24.	Commercial, Same as No. 22 but *not* machine or hand cleaned. Dried and powdered	4.27	0.87
		4.25	0.90

Sample No.	Source of sample and remarks.	Percent total ash.	Percent ash insoluble in 5% HCl.
25.	Commercial, Peeled Italian Licorice, bought 1921, apparently prepared from *Glycyrrhiza glabra*, powdered in this laboratory...	4.02	0.67

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THE MANUFACTURE OF EFFERVESCENT SALTS.*

BY ROBERT C. WHITE.

A very interesting class of the less important pharmaceutical preparations are those known as "Effervescent Salts." An Effervescent Salt, as we all know, is really a medicated ingredient in combination with an effervescent base designed to present the medicated agent in a palatable effervescing drink. The textbooks contain a good deal of information regarding salts of this character, but are deficient in certain interesting facts concerning the manufacture of these products on the larger scale.

GENERAL NOTES.

Effervescent Salts have been very well known for the past thirty-five years. It might be said that they attained the peak of their popularity about fifteen years ago. The novelty, however, of watching the bubbles has suffered a very serious decline in the last few years, as may be noted by the fact that there are only five Effervescent Salts officially recognized in the present Pharmacopoeia. A very much larger number, however, are offered by manufacturers, and there is still considerable demand for these products. The base of this class of products is composed of practically the same ingredients, no matter what the medicinal agent, although the proportions may vary widely on account of the differences in the physical properties of the active agents used. In all cases the ingredients must be reduced to a moderately fine powder, and these are thoroughly mixed before any attempt is made at granulating. For years sugar was used in the base, not only on account of its ofttimes rendering the taste more pleasant but because sugar, when moistened or heated, makes an excellent binder for holding granules in even-size particles. It was long ago discovered, however, that sugar could not be introduced into a salt without greatly lessening its keeping qualities. There will also develop a discoloration, tapering from a pale cream color to a dark chocolate brown, even though the package remains unopened and according to the length of time the product is kept on hand. For years effervescent salts were made by the simple method of triturating the ingredients into a fine powder, mixing them, and then moistening the entire mass with alcohol. It will be noted here that strong alcohol only could be successfully employed, as the presence of water produced a very sticky mass, permitting a very generous reaction between the acid and alkali in the base, and thus rendering the ultimate product much more inert so far as effervescence was concerned, and much more slowly soluble. The moistened mass was forced through a well-tinned screen of proper mesh to produce

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* Read before Pennsylvania Pharmaceutical Association, Philadelphia meeting, 1921.

granules of the size desired. The drying of these moistened granules was then carried on as expeditiously as possible in order to prevent any loss of effervescent properties. The temperature employed usually was not over 130° F., in order to prevent the decomposition of sodium bicarbonate. These salts, as we all know, should be preserved in well-stoppered bottles, and even then should be stored in a dry place. It has been found practical in a good many cases to use bottles of blue glass, when the salts are to be kept for a time, as they discolor more readily in flint containers.

PHARMACOPOEIAL DIRECTIONS.

The U. S. Pharmacopoeia, at the present time, directs that for the preparation of an Effervescent Salt the mixed powders be placed on a sheet of glass or in a suitable dish, and then put into an oven heated to between 93° and 140° C. (199° to 219° F.); when the mass, after careful manipulation with a wooden spatula, has acquired a moistened condition it is to be rubbed through a number six well-tinned iron sieve. This is then to be dried at a temperature not exceeding 54° C. (129° F.). The formulas of the Pharmacopoeia, however, are defective, as too little citric acid is employed, and a good granule cannot be produced; no allowance is made for loss through the escape of moisture and carbon dioxide, which is bound to take place during manufacture; as this loss is due to climatic conditions, which are subject to change, it is readily seen that the percentage content of the medicinal ingredient may vary from 8 to 14 percent. In all cases the citric acid should be the last ingredient added, as otherwise, if made during humid weather, the mass will moisten unevenly, producing translucent particles which will be very slowly soluble when brought in contact with water.

NATIONAL FORMULARY DIRECTIONS.

The general formula given in the National Formulary is also faulty in some respects. The mixing of the ingredients in a mortar, as directed, will produce an undesirable gummy mass, probably on account of the pressure exerted by trituration. The stirring of the mass in an evaporating dish over a water-bath, kept at a temperature of from 60° to 70° C. (140° to 160° F.) until dry, will produce a great deal of fine powder and irregular sized granules and, for reasons heretofore stated, sugar should not be employed.

MANUFACTURE IN LARGE QUANTITIES.

Now regarding manufacture in larger quantities (that is, where salts are manufactured in five hundred, one thousand and two thousand pound lots).—The manufacturer's definition of an Effervescent Salt would probably be—"A medicinal ingredient in combination with an acid and alkali which form in the presence of moisture an effervescing compound."

Classification.—The manufacturer being a busy man and ofttimes surrounded by helpers whose knowledge of pharmaceutical terms and procedures is limited, frequently resorts to the simplest and most practical way of classifying his products: The Headache Class, the Diuretic Group, and the Laxative Group. This separation seems crude perhaps, but, after all, is a very simple subdivision for manufacturing designations. The first named—the "headache group"—combines those having sedative and analgesic properties, their use being entirely confined,

by the layman at least, to his treatment of headaches; they chiefly embrace the salts containing acetanilid and phenacetin and their compounds. The "diuretic group" includes those products which increase renal secretions, etc., such well-known products as lithium carbonate and citrate, also such alkaline salts as potassium acetate, etc. The third and last group is the greatest of all, namely, the "laxative group;" the term covers them broadly, and includes the well-known Effervescent Salts of sodium phosphate, magnesium sulphate, sodium sulphates, etc.

Working Methods.—After a definite formula has been determined upon all ingredients should be reduced to a sufficiently fine powder and screened, bearing in mind that all screens must be well tinned, in order to prevent contamination.

Mixing.—These ingredients should then be placed in a well-enameled mixer, the powdered citric acid is added last, and in all cases prepared from unefflorésced crystals. When these powders are mixed thoroughly which, in the case of 100 lb. working batches, should not be for less than fifteen minutes, the powders are placed in shallow enameled pans, or in plates of glass, or in shallow well-enameled steam jacketed pans. The question of the proper amount of heat to use at this stage is one which requires careful determination.

Heating.—Such salts as those containing citrated caffeine, acetylsalicylic acid, or such like acting products, should not be exposed to too high a temperature. These three methods of heating demand some explanation. When the simple pan method is employed it is necessary to have the salts only of sufficient depth that the heat may readily penetrate all portions thereof. These pans when placed in a heated closet are very cool, or moderately cool, which means that the exposed upper surface of the salt mass coming in contact with the heated atmosphere will soften, or at a high temperature almost melt before that section protected by the pan has arrived at the plastic state. The same applies to the glass plate method, although in this case the glass plates are usually allowed to remain in the heated chamber, which is a better method. However, it means that we have the reverse conditions of the pan method, namely, the surface lying directly against the heated sheet of glass will melt first, whereas the surface coming in contact with the atmosphere is more slowly affected by the heating; therefore, the need for manipulation. The simplest plan after all is the one where the salts are placed either in shallow jacketed steam pans, or on an enameled surface steam table and considerably manipulated, so as to bring all parts into equal contact with the heated surface according to the amount of water of crystallization present in the ingredients. While the manufacturer may know the technical reasons for the difference in this mixed mass at various stages, he cannot be independent of the operator himself who determines the condition of the mass by taking a handful and squeezing it to discover its degree of plasticity, or, as the operator would say, "the feel of it." This is after all the most difficult stage in the making of effervescent salts, regardless of what may be written.

Weather Conditions.—The manufacturer is not independent in the majority of cases of weather conditions; on a very humid day some of these masses will melt down very rapidly, while in very dry weather after the usual length of exposure to heat the mass will not become quite plastic enough, and would result in a powdery preparation. A very few of the manufacturers in this country

have made efforts to overcome this condition, as for years it was impossible along the Atlantic seaboard to make effervescent salts during July and August.

Air Drying.—The writer's experience has been that the only way to become independent of this condition is to have in reserve a trough which can be filled with calcium chloride. This may be made of heavy lumber 12 feet in length, 12 inches square and tilted so sharply that when calcium chloride is placed in the upper opening it will slide downward and thus keep packing itself. A suction blower is then arranged to draw the air through and over the calcium chloride into the room where this work is done. The advantage of this tilting of the calcium chloride tube is that the chemical itself may be deposited at the upper end, while from the lower end the saturated solution, from the moisture in the air, continually drains off, thus allowing the calcium chloride to drop downward, and leave space for more to be added at the upper end. This method, while crude, is effective, and is much superior to that of heating the atmosphere of the room to such a degree that the operator cannot work. Even this method, however, is not sufficiently dependable to permit the use of a set formula. The adjustment has to be continually made between the tartaric and citric acids in the base as the tartaric acid contains practically no water, and the citric acid in crystal form does.

Acids.—It might be well to state, at this stage, that citric acid makes a finer salt than tartatic acid, but a combination of the two is preferable, as it permits of the adjustment of the water of crystallization in the base without materially changing the taste of the finished salt. Tartaric acid does not possess the pleasant taste of citric acid, it has a salty taste and lacks the fruity element combined with the sourness of citric acid. The physical disadvantage of using tartaric acid in the place of citric acid is that the resultant granules are soft and chalky, and these granules break down with handling and in shipping. The writer has found that a combination of one-third tartaric acid and two-thirds citric for the acid content will give a mass of pleasant taste, and uniform granules. Unless for good and sufficient reason, the manufacturer should not change these acids, as it is quite possible when the medicated salt contains water of crystallization to make this adjustment without changing the balance of the base.

Adjustment of Base.—For instance, in a formula for Sodium Phosphate, Effervescent it is best to make the moisture adjustment between the proportions of dried and powdered sodium phosphate, and a small proportion of crystals of sodium phosphate which is retained in the product, and contains between fifty and sixty percent of water of crystallization.

Sifting.—When the plastic mass has been sufficiently heated it is then placed in a mechanical sifter and forced through a screen of the proper size, usually a number 6 or 8 mesh, and the soft granulation is then ready for drying. These moist granules must not be placed in too thick a layer, as their own weight would cause them to cling together again.

Drying.—We now reach the drying stage. There are various forms of dryers. For years the old-fashioned trays the bottom of which was composed of netting, canton flannel, canvas, or some such coarse fabric were used in what was known as the ordinary air dryer, a set of which looks like a small row of bathhouses. These closets are equipped with steam coils at the bottom, an opening

being provided at the bottom and one at the top permitting the incoming air to be heated, ascend and escape at the top, drying the ingredients which were placed upon these trays. This method, in recent years, has come into disuse with the majority of manufacturers as the wooden frames and fabric bottoms of these trays were liable to contamination and stains, which also made for unsightliness and disorder. Sheets of glass, aluminum trays, and block tin trays are steadily coming into use. The old air dryer has given way to such improved apparatus as was described in a previous publication by the writer on "Tablet Manufacture."[1]

Belt Dryer.—Very large manufacturers have experimented, and some successfully, with belt dryers, the principle of these being that at one end at the top of a large drying chamber the moist salts are automatically fed to a belt which slowly carries them 30 or 40 feet through the heated atmosphere, and drops them on a belt below, traveling the other way, which returns them to the end at which they had been injected, and so back and forth until the salts drop off the lowest belt perfectly dry. The speed of these belts is regulated to carry the salts out only in the time necessary, and the temperature of the dryer is capable of accurate control. In fact, this method has been long in use by the manufacturer of one of our best known trade name effervescent salts. This method is chiefly applicable to a plant manufacturing one salt continuously, but shows great disadvantages.

Vacuum Drying.—Probably the best form of drying salts in large or small quantities of different kinds is in the vacuum dryer which has been quite extensively used for the last ten years. This vacuum dryer consists of a large cast iron chamber containing hollow shelves which are filled with steam or hot water as the case may require; the salts in shallow aluminum trays spread about one inch deep are placed on these heated shelves, the door tightly bolted, and the vacuum pump turned on. A very speedy cessation of reaction takes place under these conditions, and as the moisture is drawn off the reaction gradually ceases, and a higher vacuum is obtainable. These vacuum dryers can be operated with a working vacuum of from 26 to 28 inches, which is unquestionably a very fine working vacuum. Other advantages of the vacuum system are that the salts can be dried more rapidly, there can be no contamination from outside sources, and if the new working batch is just about completed when the quitting hour arrives the pumps may be shut down, the vacuum chamber sealed, and if the apparatus be in perfect working condition the vacuum chamber may be left unopened with perfect safety until the next working day. This is a vital matter so far as the manufacturer is concerned in these days of workmen who are demanding thirty-six hour weeks, with eighty hour pay, and double pay for overtime. As this dryer can be equipped so that the heated shelves may be filled with steam or hot water it will be readily seen that there is a very great flexibility of control of temperature. Some salts will stand a temperature of 160° F.; those containing caffeine will show sublimation of the caffeine on the walls and sight glass of the chamber at even 110° F.

Removal.—The salts when properly dried are removed from the dryer, and rapidly screened in order to break up the granules which have clung together, thus resulting in a uniformity of granules. Great care is exercised in the selection

[1] Jour. A. Ph. A., 9, 788, 1920.

of mesh for this purpose as all manufacturers desire a finished salt having uniform granules, and as little dust powder as possible. Some manufacturers endeavor to rework the dust which they may screen from the finished product. This, however, should not be done, as it will be found that the proportion of ingredients present will differ considerably in different lots, and a partially insoluble salt will result. These dry granules are then either filled immediately, or stored in air-tight containers. The writer has found it advantageous to store these salts for a period of three days in order to become assured that the product is perfectly dry, and that all reaction has ceased. A simple method, but one which he has not seen used elsewhere, is to place these in 50-pound air-tight containers having a small pet-cock which is kept closed. When the salts are ready for filling, a small rubber tube is adjusted over this pet-cock, the end placed in lime water, and the pet-cock opened. If any further reaction has taken place the carbon dioxide coming through the tube will produce the usual milky reaction which indicates that the salts should be re-dried immediately.

Filling.—The salts should be opened quickly in a room containing dried air, corked and filled immediately, the bottles before filling being withdrawn from a heated chamber, and the salts filled from a heated hopper. Under these heated conditions there is less possibility of the salts absorbing moisture. It must be remembered that the effervescence of the finished salt may be largely controlled, for by changing the proportions in the base we can develop a salt which may go to the bottom of a glass and then effervesce, or which will entirely effervesce on the surface of the water, or even effervesce when half way down in the water, and then completely dissolve before touching the bottom. The manufacturers of some salts demand greater effervescence than others, if they think that a rapidly soluble and live effervescence is more pleasing to the customer. These, of course, are matters of personal taste, as is evidenced by the following story. The granulation for effervescent tablets such as Lithia Tablets is manufactured in exactly the same way as effervescent salts. In fact an effervescent tablet is frequently nothing more than a compressed tablet of an effervescent salt. The writer, while serving his time as an effervescent salts maker, discovered that after having kept a year's record of humidity and temperature taken every hour of the day he could, knowing the temperature and humidity, determine speedily what amount of water of crystallization should be used in any salt manufactured on that specific day. From this series of determinations it was but a step to find how to make salts effervesce more readily and abundantly, how to make salts effervesce on top of the water, under the water, or from the bottom of the water; and then being filled with great pride in his accomplishment, he determined to make a very live Lithium Citrate Tablet. The best record, taken from competitors' tablets, was one which dissolved in forty seconds in ice water. Please do not forget that ice water is the hardest test for quick effervescence of a salt. He then developed a tablet which would completely dissolve in twenty seconds, and proudly showed his product to certain members of the firm. At this stage the wet blanket was applied, and he was told that the person who had to use Lithia Tablets was usually inclined to be gouty, or full of uric acid from too high living, and that he was one whose condition proved he loved to linger at the table and who consequently liked to see the tablet flop up and down and effervesce in a dignified manner. So there you are.

You may juggle the acid and alkali in the base, you may either use high or low steam pressure in making the mass, and thus take your choice of whether you want a lively effervescent salt, or one more dignified in reaction. A peculiar thing is that while we have been accustomed to effervescent salts for years, the majority of users seem to think it necessary to swallow the salt at its highest point of effervescence, thus filling the mouth and nose with carbon dioxide, and in some cases producing discomfort. An effervescent drink of this kind should be taken just when effervescence subsides, as then the drink is fully charged, without an overabundance of effervescence.

Concluding Remarks.—Now for exact and intimate information regarding details which are not published in our textbooks. The temperature of the room in which effervescent salts are made usually runs from 110° to 120° F. The operator should, therefore, equip himself with a two-piece garment, ordinarily known as shirt and overalls. The floor being hot it is necessary for him to wear shoes. His elimination will be perfect, as with his very active work in this temperature he will perspire profusely. A pair of leather-faced gloves are always held in reserve as it is impossible to handle these hot trays and dryers unless the hands are protected. After two or three years' training under these conditions a man is not only down to his best weight, but he has demonstrated that he is capable of standing considerable hardship, and the writer has noted that no actual effervescent salts maker who indulges in the work himself ever finds it necessary to take any of the bath treatments which are strongly recommended by many of our sanatoriums, and as many of the products he makes are similar to the analyses of well-known springs it has been noted that he never goes to any until he leaves this work and advances to a position of higher responsibility. Under these circumstances, do not envy the effervescent salts operator. His lot is not an easy one, and a last problem:—after all precautions in drying thoroughly the air in a room which is maintained at a temperature of 120° F., how can you keep the operators from generating considerable moisture in the form of profuse perspiration?

I rarely look at an operator when in full working condition that I do not think of the scriptural injunction—"In the sweat of thy face shalt thou eat bread."

SHALL WE REQUIRE FOUR YEARS OF HIGH SCHOOL STUDY?*

BY AUGUSTUS S. DOWNING.[1]

The suggestion to amend the New York State pharmacy practice act so as to

* This important communication is reprinted from the August *Druggists' Circular*, p. 285, and is based on an inquiry addressed to Dr. Downing by the *Druggists' Circular* when it became known that he had expressed his opposition to any change in the New York State Pharmacy Law, which would make the completion of four years of high school study a prerequisite to pharmaceutical registration after July 1923. *The readers will understand that the personal references are made to the publication from which the communication is reprinted.*

Data relative to prerequisite legislation will be found on p. 500 *et seq.* (June issue JOURNAL A. PH. A.) in an article by Joseph W. England. Copies of Dr. Downing's communication have been sent to college deans; quite a number of replies are expected which the *Druggists' Circular* hopes to print as a symposium. The JOURNAL A. PH. A. has asked for replies from allied bodies of the American Pharmaceutical Association.—The Editor.

[1] Assistant Commissioner and Director of Professional Education, the University of the State of New York.

require a severer prerequisite general education preliminary to the study of pharmacy has come to me from time to time, but I do not recall any occasion when I publicly announced myself as opposed to the suggested amendment. But I have no hesitation in voicing my opposition to the suggestion in your communication, namely, that the completion of four years of high school study shall be a prerequisite to pharmaceutical registration after 1923.

Moreover, if you regard this expression of my opposition worthy of place in your columns for consideration and helpful discussion, you are authorized to place this statement before the deans of the various schools holding membership in the American Conference of Pharmaceutical Faculties.

First, I am clear in the opinion that such requirements (*i. e.*, four years of high school study as a prerequisite after 1923) *if honestly administered* would place any state of the Union in a class by itself—there would be no applicants for registration after that date for some years, if not forever.

I base this opinion upon New York State's experience of which I have had close personal knowledge for more than a decade and accurate written records of the state's experience for more than a century.

It may not be known to you, but it is a fact that when the American Medical Association forced the deans of the schools holding membership in the Association of American Medical Colleges to require first one year of college work for entrance and then the very next year changed it to two years of college work, New York insisted that it was not for the best interests of the citizens of this state nor for the medical schools of this state to so far advance their entrance requirements. And we maintained our position of requiring the satisfactory completion of four years of high school work with the sciences (physics, chemistry and biology) for three or four years after the American Medical Association had announced that schools that did not accept the college entrance requirements would become Class B Schools. This did not, however, affect the schools of this state so far as admission of the graduates to the licensing examination was concerned; nor did it in any way affect those seeking admission to our medical schools.

As you well say, "New York has always been a pivot state in matters of this kind," and I may add New York has frequently been accused of advancing too rapidly, so we can properly risk the accusation that we are not up to date so long as we are protecting the better interests of the citizens of the state.

Second, the reasons that lead to the conclusion that we are protecting New York State's pharmaceutical interests through the determination to "go slow" are too many for the time and space available for their careful consideration.

When the questions which you have raised are discussed they should be discussed with the possibility of New York's representative going to New Orleans and defending principles based on facts which if unsuccessful would warrant the state in going it alone till such time as experience should demonstrate the accuracy of our conclusion.

Third, while the question you have raised deals primarily with the advancing of the general education preliminary to the study of pharmacy, there are two other even more important questions involving New York State's relation to the other states of the Union. Not only do we face in the next four years in addition to

our present minimum requirements the addition of two years of high school study, but one additional year also of college study, a total of three years, that is, a seventy-five percent increase over the present minimum of high school and college work. Does it not occur to you and your readers that this radical increase in requirements within the short period of four years is, to say the least, worthy of receiving most careful attention?

The syllabus committee has for years been steadily endeavoring to complete the outline of the third professional year and to prepare a rational syllabus thereon. The National Association of Boards of Pharmacy has been endeavoring for eight years to adjust their examinations to the requirements of the second edition of the syllabus with what result? And New York State has marked time while its syllabus committee has awaited the action of the national syllabus committee.

A committee of the New York State Board of Pharmacy has given careful study to the reciprocal relation existing between the board and the other state boards of the Union that form the national association. The recommendations of that committee to the Regents of the University of the State of New York are before me as I write. From this report it appears that there are now forty-four states having an active membership in the association, that our state maintains an associate membership on the theory that our standards are higher than those of most of the other states; that at the present time some of our best men are migrating to other states by means of the reciprocal action of the association; that no method exists for the entry into this state of fully qualified men except by proving that they have reached a position of conceded eminence and authority and that such proof is impossible by any person in the early years of professional practice; that on the other hand a few years from college renders an examination equally impossible.

I am informed that only fifteen of the states of the Union have a prerequisite law—that is, of the forty-four states having an active membership in the association less than one-third require any educational qualification for admission to the practice of pharmacy other than an examination. How many of the states in this minority meet the New York requirements for admission to their licensing examination—two years of high school preparation, followed by two years of professional instruction?

Let me in closing assure you of New York's continued desire to serve her sister states in advancement of higher professional attainments and of our earnest wish personally to share the labor and sacrifices of time and money for the closer coöperation of the schools, the boards and the associations, working for the benefit of our respective commonwealths, and the general welfare of our country.

MILITARY PHARMACY SYSTEMS IN EUROPE.

Pharmacist Fredrik Bergendorff of the Garrison hospital in Stockholm has recently returned from an official mission to France. It is proposed to reorganize the Swedish military pharmacies. Pharmacist Bergendorff is quoted in the Stockholm press as saying that the French medical organization has experienced considerable development, and new reforms are contemplated; French military pharmacies are not considered as an economic burden—before the war it was found that their system resulted in an annual saving of about four million francs in the medicine and sanitary budget estimates, and figures are now higher.

CABINET GOVERNMENT AND PHARMACY.*

BY JOHN CULLEY.

Prior to the year 1788 a cabinet form of government was unknown. It was during that year that a number of the world's bravest, brightest and farsighted men met in Philadelphia and after endless deliberations, trials and tribulations, produced the world's greatest and most important document—a constitution which provided for the republic of the United States of America. This republican form of government as outlined is a cabinet form of government, for the constitution provides that the president, with the approval of congress, shall appoint heads of departments to cover the various fields of activity within the realms of national government. These heads of departments constitute what is called the cabinet. It is presumed, and no doubt is true, that the President in his great wisdom and for the welfare of his government and its people would select for appointment as members of his cabinet, who serve as heads of the several departments, men who are best qualified by knowledge and training in the particular field of endeavor in which they are to work. It was contemplated that a cabinet officer in making his selections of men to fill subordinate positions would exercise like judgment.

WHAT THE CONSTITUTION GUARANTEES.

Therefore, with the organization in force, the President desiring to deal with any important governmental matter would call into conference the cabinet officer whose department covered that particular field of activity. If the question is of such importance as to involve a national or international issue the entire cabinet is called into consultation. When a course of action is determined upon as a result of these conferences of the president and his cabinet officers, the matter of putting into operation the plan outlined is carried on through the regular channels of enacted law.

This is a concise outline of our cabinet form of national government.

Section 4 of Article IV of the Constitution of the United States reads: "The United States shall guarantee to every state in the union a republican form of government."

The republican form of government is essentially a cabinet form of government.

This republican or cabinet form of government never seems to have appealed to the various states, as they are all inclined toward what may be termed a commission or board form of administration. This commission or board form of government has been tried at various times in a national way but has never been successful.

The greatest minds of our time were against it. Alexander Hamilton says: "Boards in my opinion are a bad plan." Lincoln is quoted as saying: "I have done with commissions; they are contrivances to cheat the government."

The National Government has found by experience that the more they deviate

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* Contributed to and reprinted from the *Pacific Drug Review*, August 1921. Mr. Culley is a past-president of the National Association of Boards of Pharmacy and at present a member of the executive committee of the association. He is also a member of the U. S. P. Revision Committee, of the Syllabus Committee and of the Utah State Board of Pharmacy.

from the fundamental cabinet form of administration the more inefficient and less economical they become.

ELIMINATION OF BOARDS LOGICAL.

The state government organized and conducted as a cabinet form would eliminate all boards, commissions and other like agencies that are said to be injurious to good government.

Strange to relate, no state government availed itself of its constitutional right and privilege of self-government in the cabinet form until Governor Lowden proposed it to the legislature of the state of Illinois and it was enacted into law in March 1917.

This law, called the civil administrative code, was introduced in the interest of economy and efficiency and reorganized the greater part of the administrative machinery of the state by consolidating the functions of some 130 boards, commissions and agencies previously independent of each other into nine departments—agriculture, finance, labor, mines and minerals, public health, public welfare, trade and commerce, public works and buildings and registration and education.

The heads of these nine departments constitute the governor's cabinet, which is analogous to that of the cabinet of the President of the United States.

It was contemplated by the framers of this law that the governor should follow in the footsteps of our President and appoint cabinet members who will act as heads of the various departments, men who are well qualified by knowledge and training in the particular department over which they will exercise jurisdiction, and, moreover, they shall be men with more than the average of executive ability and managerial capacity, and, further, the cabinet officers will exercise that same judgment in appointing their subordinates.

A state having 100 boards and commissions—and many states have more—will have that number of agencies administering the law and overlapping work enormously. Every board is a law unto itself. It initiates legislation in its own interest, it is burdened with executive powers, judicial affairs, police and inspection duties and law enforcement of various kinds, and in addition must take care of the clerical duties incident to keeping up such an office. These boards may be very efficient in carrying out their own particular work and perhaps in most cases economical, but these various and varied duties saddled onto the several hundred boards are misplaced. These powers were intended to be and should be placed in the hands of the chief executive of the state and administered through the heads of the departments as practiced nationally and as outlined in the Illinois law.

CONSOLIDATION GAINS IN POPULARITY.

The consolidation of boards as a measure of administration of state affairs is fast becoming popular, as at least ten states have adopted that plan and many more are striving for it.

Under the consolidation plan, where the executive powers, various functions pertaining to law enforcement and all clerical duties are handled through a central office under the direction of an efficient officer, the examining boards can devote themselves to their main business, as originally intended, that of examining and

passing on the fitness of applicants to practice their profession, trade or occupation for which a state certificate of registration is granted.

Now let us see how the consolidation plan affects pharmacy in particular.

It is also said by those who have made an exhaustive study of both national state forms of government that our state governments are weaker, less economical, more inefficient, less effective, more chaotic, just in proportion as they have deviated from the cabinet form of administration as adopted by our national government.

Boards of pharmacy have been particularly blessed in being non-partisan. With few exceptions the members have been appointed for their ability rather than for their political affiliations. Under the new system of law there is great danger of politics entering into appointments.

Influential workers of the winning party are mighty touchy when it comes to the distribution of political plums and if they are not allowed to select henchmen of their own they are apt to retaliate by preventing the formation of a good department. As the governor of the state is held responsible for everything done in the departments, he should not be compelled to appoint mere politicians to positions when men of ability are needed. If the governor is able to make wise appointments for heads of the departments his success and the success of the departments are assured and the interests of pharmacy will not suffer.

Every state in the union has a pharmacy law more or less built on the same lines and with which we as a class are more or less familiar. Under the Administrative code, as a measure of administration of state affairs, the law as it affects the pharmacist at large and the public generally is not materially changed. It is merely the standing of the board that is affected. The preliminary and prerequisite educational requirements necessary for one to have before being permitted to take the examination or to practice his profession remain the same as outlined in the original law. The safeguards regarding the handling of narcotics and poisons remain as originally incorporated in the law. The high standards of examinations and gradings remain as heretofore. The reciprocity features as outlined in the National Association of Boards of Pharmacy are still in force; if provided in the original law and if effective by means of by-laws the head of the department has the power to re-enact them and place them in force.

TESTING THE FITNESS OF APPLICANTS.

The only change of note from the old condition of affairs to that of the new method is the placing of all the powers and functions of the pharmacy board, with the exception of the examination features, in the hands of a department of state government whose head officer is designated by the various states as director of registration, director of licenses or director of law enforcement.

The actual duties of testing a person's fitness to practice his profession by means of examinations now becomes the sole duty of the board of pharmacy, as it is of all other boards coming within the meaning of this act.

As stated previously, the original law of this character was introduced in the state of Illinois. It was built to harmonize and coördinate with the existing laws as they appeared on the statutes of that state. Other state governors who desired to have such a law enacted in the states over which they rule have taken from the Illinois laws portions of the statutes that appealed to them, have added thereto

and subtracted therefrom sections of the law that in their opinion were best suited to their own states, with the result that their law is not apt to work out as expected and as it does in the mother state for the simple reason that not all pharmacy and other laws affecting the professions are alike in all states.

As an example, some states have given the board of pharmacy the unusual power of making rules and by-laws for the enforcement of the pharmacy act and of setting standards for educational qualifications. These rules and by-laws by virtue of the powers reposed in the board of pharmacy have become common law, although not on the legislative statutes of the state.

The passage of the administrative code automatically suspends all such by-laws and rules of the board and the uplift work of many years is very apt to be in danger. However, the law gives the same power of formulating rules to the head of the department and if he is the right kind of man and has the interests of pharmacy and the public at heart he will re-enact the rules, regulations and by-laws which have been established by the former board of pharmacy.

STABILITY DESIRABLE IN EXAMINING BOARD.

The passage of this law also automatically abolishes the existing board of pharmacy and places the appointment of the members of a board of examiners to take its place in the hands of the department head, instead of coming as a state commission from the governor, as formerly. Incidentally, the term of office of board members is now made indeterminate, depending on the whim or pleasure of the director of the department.

Every one in the profession realizes the danger of too frequent appointments on an examining board. It takes years to qualify a member of a board to become really a proficient and scientific examiner, no matter what his previous education and experience as a pharmacist may have been. Any one can ask questions but it requires an expert to ask a scientifically constructed question that will really determine the knowledge and fitness of an applicant for registration to practice his profession.

Few states pay to the members of a pharmacy board a compensation commensurate with the work performed or expected but demand men of high scientific attainments, executive ability and education above the ordinary, and incidentally the very valuable time of usually very busy men. The members of a pharmacy board serve their term of office not for the monetary consideration obtained, but for the sentiment held for the profession—a desire to do their duty to the state, help their fellow pharmacists and protect the public, and last, but not least, for the honor, the glory and dignity of being a member of a state board and being the appointee of a governor.

Even the honor and dignity of having the name of "board of pharmacy" is now denied the profession in most cases, as the code law calls it by the undignified term of committee of examination.

Formerly, members of the board, being responsible by law for the high standards of examinations given and the qualifications required of applicants, issued and signed the certificates of registration as a mark of authority and responsibility. The new order takes away this dignified privilege and requires the director of the

department to issue and sign the certificate, but holds the examiners responsible for the applicant's proficiency.

MOST OF HONOR AND DIGNITY TAKEN AWAY.

Take away the honor of being the governor's appointee, the dignity of signing the certificate while being held responsible for the same, the lack of definite terms of appointment, the abolishment of all executive powers, take away even the name of the board, and what is left? The empty honor of being privileged to give an examination to applicants and certify the results to the director.

In some states having this code of laws, the examining board is not even the final arbiter of its own work, as the law gives the director of the department the power of ordering another examination and with a new board if in his judgment the examination was not what he considered a fair one.

This provision is a strange one, as practically all the code laws specifically state that the head of the department shall not be a member of any of the professions he represents.

The provision is not in all the laws, however. The Illinois law specifically states that the director of the department shall exercise all the rights, powers and duties vested by law in the state board of pharmacy, but qualifies it by saying: "None of the duties and functions of the board shall be exercised by the department head except upon the action and report in writing of the appointed board."

If this latter clause were incorporated in all the new consolidation measures, little trouble and but few serious changes from former methods would result.

Pharmacists to-day stand in a most enviable position, in a class distinctly by themselves. Practically every law in the nation affecting the practice of pharmacy was placed on the statutes by the pharmacists themselves, wholly for the safety of the public and for its protection from incompetents, and not for any selfish motives or particular benefits for the pharmacist himself.

Even the necessary funds for the enforcement of the pharmacy laws are provided by pharmacists in the shape of examination fees and annual dues. Pharmacy laws are a financial asset and not a liability to the state as most other laws are which concern the professions.

After all pharmacists have done for the elevation and advancement of the profession and the protection of the public, the honor, the dignity of the work is taken away. Is it any wonder that the profession as a class seem grieved at the new order of things?

It must be admitted, however, that this revolutionary, or perhaps evolutionary, idea of consolidation of administrative forces is a progressive one even though it goes back to our national government for the idea. The changes in administrative form while seemingly drastic are not so very serious after all. They touch our pride rather more than our principles.

As time goes along and portions of the measure prove impracticable or not satisfactory a thorough discussion of the objectionable features together with recommendations for improvements can take place at the state association meetings and incorporated in a communication to the governor of the state, and as he has the welfare of the people at heart it will be sure to receive full and due consideration.

Lastly let us not forget two fundamental propositions: "In organization there is strength," and "Ask and thou shalt receive."

HOW SCHOOLS CAN AID IN PUBLICITY WORK.*

BY HERMAN P. REIF.[1]

One of the outstanding weaknesses in pharmacy is the lack of the right kind of publicity—the kind that inculcates the public mind with a true and thorough understanding of the profession, not as depicted by our garrulous, unsophisticated and imaginative newspaper reporters, but as practiced by the rank and file of our profession, from the humble and ethical corner druggist, principled and trained in ways and means of serving mankind, to the college teacher, whose main duty and object is the emancipation of pharmacy from the degradation of a distorted public opinion.

It cannot be disputed that pharmacy has received the proverbial "black-eye" by the constant misuse of the term "drugs" for narcotics. It has received a deep flesh wound by the more recent application of the title of "retail liquor dealer" to liquor dispensing pharmacists. Newspaper accounts alluding to either or both of these subjects are daily occurrences, so numerous, in fact, that the reader may well question whether the majority of druggists are not engaged in "drug traffic" and "bootlegging." It is public opinion, not the true conditions prevailing in pharmacy, which counts most when the reputation of our profession is at stake. A definite plan for pharmaceutical publicity has long been an urgent necessity and it is most gratifying to know that druggists in the northwest territory have taken the initial step toward creating a receptive public mind for pharmaceutical propaganda.

THE PART OF THE SCHOOLS.

What part can schools of pharmacy play in a definite publicity scheme? They can furnish unlimited material for publicity work, but, first of all, let us determine a definite publicity plan, so that we may ascribe to our schools specific material and a specific place in our plan.

Naturally our first effort should be directed toward the elimination of the evil and malicious practice of the national press in the treatment of pharmaceutical news material. Unquestionably much of the malicious matter results from lack of knowledge.

Second, we should furnish news material of the human interest type that tends to counteract adverse publicity that may creep into our national press.

Third, prominent display and publicity should be given to the administration of pharmaceutical affairs, local, state, and national.

Fourth, we should provide our newspapers with articles partaking of human interest and informative material, which will tend to create a sympathetic public mind toward the profession and a better understanding of pharmaceutical activities in general. The latter class of publicity endeavor is the field in which schools of pharmacy can lend their best efforts.

You may have a vague conception of what is meant by "human interest and informative material," consequently it shall be my purpose in the remainder of

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[1] Professor at the University of Wisconsin.

this paper to analyze and explain the fourth part of the publicity plan insofar as schools of pharmacy can coöperate.

HUMAN INTEREST APPEAL.

"Human interest" material can be defined better by illustration. A newspaper man might define it as that type of news matter which may be fashioned to appeal to the interest of a large number of readers through satisfaction of curiosity, or by way of associating past experiences with facts contained in the article. The story of horsemint (Monardo), which might be titled "From Weed to Mouth Wash," may be used to illustrate this point. Here we have the association of an every-day act, use of mouth wash, with that of pharmaceutical research, the isolation of thymol from horsemint. Naturally, however, the article would necessarily be written, not from a technical point of view, but from the point of view of the interested reader. News material of this type can be provided by our schools of pharmacy.

Research material on digitalis could be treated in a similar fashion. Local color, also, could be instilled by comparison of the English variety with that of the Wisconsin or Minnesota digitalis. Likewise, belladonna lends itself admirably for an interesting human interest article. Newspapers are willing to extend financial remuneration for stories of this kind when accompanied by photographs. The larger newspapers use them in their Sunday magazine sections. Research problems in chemo-therapy, provided they can be translated into human interest articles, afford material for pharmaceutical publicity.

STORIES THAT APPEAL.

Aside from research problems, schools of pharmacy provide another class of news material. It is a type which requires little or no surgical treatment to render it palatable and interesting to the human intellect. Several years ago the writer sent an article on the pioneer drug store in the State Historical Museum to one of the larger state dailies. It was used with illustrations and no doubt proved interesting to a large number of readers. It is this type which I allude to as informative material.

The Wisconsin Pharmaceutical Experiment Station could be used for an interesting article. The information contained would appeal to the pride of Wisconsin people and to the interest of readers in other states. At the same time readers would find a fund of facts which would perhaps change their opinion of the profession of pharmacy.

Statistics of its graduates could be woven into an interesting story by the school of pharmacy, as well as historical matter pertaining to the practice of pharmacy. These articles could be local or of state-wide interest.

All possible subjects have by no means been named, but those that have been given indicate how the schools of pharmacy can aid in publicity work providing the news material. Besides providing the actual news material, schools can supply useful information to be used by publicity bureaus. The extent of this information would probably be limited only by the bureau's wants and needs and the ability of the school to coöperate in time and effort. Unquestionably the coöperation of publicity bureau and school is highly desirable, even urgent, and would result in tremendous value to the profession.

AN ADVERTISING CAMPAIGN INCREASES FINANCIAL RESPONSIBILITY.*

BY WILLIAM T. MULLALLY.[1]

"Treasures in heaven" are not generally recognized as a bankable asset. On the other hand, earthly good-will, reputation, and fame are not only regarded as valuable but this opinion is backed by actual demonstrations of cash value, running into millions of dollars.

A man or an organization may have two types of assets—tangible and intangible. The experience of the past few years has shown us that tangible assets are not always as substantial as we had believed. We saw merchandise, real estate, and even more stable standards of value in a merry dance of fluctuating prices which left us with an uncomfortable feeling that the bottom had dropped out of everything.

We have been less accustomed to habitual consideration of intangible asset values. We are, as a nation, gradually learning, however, the lesson that credit is just as useful as money but we do not generally realize what this credit is based upon. Said the late J. P. Morgan:

"Commercial credits are based upon character, and money or property. The first thing—before money or property—is character. I have known a man to come into my office and I have given him a check for a million dollars when I knew he did not have a cent in the world. A man I do not trust could not get money from me on all the bonds in the world."

This credit—this intangible but immensely valuable asset—is based upon character, but, as Mr. Morgan implied, it must be known character. It is impossible to borrow money or do business on a character that blushes unseen or wastes its sweetness on the desert air.

When the world was smaller, character or reputation was spread by word of mouth and other devious ways. Even then it took a long time. Generally, the man died before his repute became widespread. That happens nowadays, too.

The progressive business man of to-day adopts a policy in accordance with his character and then he tells the world about it—by advertising.

Duties assumed and acknowledged are half accomplished. If we publicly announce a policy, we will carry it through. A man may misrepresent, consciously or unconsciously, in a personal conversation or even in a written statement to some person or organization, but very few men would attempt to misrepresent in a public statement that is seen and read by all sorts and conditions of men and that is sure to be checked up from every possible angle.

Some men have tried it, to be sure. But they did not last long. The rule worked—they acquired a reputation—but it was not the kind that is a bankable asset. They cannot borrow money on it.

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* One of a series of articles in the *New York Commercial*, on advertising and its various phases of tried and true methods, written for the business executive by prominent members of the advertising profession and based on many years of successful experience and results. Reprinted from the *New York Commercial*, August 4, 1920.

[1] President, Wm. T. Mullally, Inc.

The manufacturer or the dealer who invests his money in setting forth the merits of his goods has announced his doctrines and shown his belief. He has taken his stand before the whole community. He has now waited for languid interest in him and his goods to turn in his direction. He has chosen to discard the neutrality of public indifference and to force people to have an opinion about him—be it favorable or unfavorable.

No sane man will pay to advertise a falsehood, for inevitably it will be proved and will serve as his own weapon turned against himself.

It has been said that the world values you at your own estimation. The public forms its opinions of a merchant or manufacturer very largely from statements he has made concerning himself and his goods in the public press.

And this reputation, credit, good-will, respect—call it what you will—can be shown to bear a definite relationship to the advertising that creates it, to the amount expended, the wisdom and skill with which it is planned and executed and the length of time it is continued.

Few would dispute the assertion that the words Kodak, Uneeda, Ivory Soap—to mention but a few—are valuable though intangible assets. It is common belief that they are worth a million dollars per letter. And advertising created these assets. The good-will of many big concerns is valued at several millions—and worth it.

History proves that the maintaining and protecting of a treasure is a more difficult task than the gaining of it, whether it be material fortune or reputation. The life insurance companies and trust companies tell many sad stories of the dissipation of large fortunes—not by anything that was done but by the things that were not done.

So with intangible assets. The greatest treasure we can lay up is the good-will and respect of our fellow men. But the public quickly forgets—how quickly they do forget! Others are pressing for their attention every day. In a remarkably short time a name, an organization or a product passes out of mind to oblivion.

We insure our tangible assets against fire and other destructive influences—what insurance is there for good-will, for the trust in the manufacturer and the belief in the desirability of his product?

The same potent, living force that created will maintain and protect. Advertising will mount guard and will do its duty faithfully and well. But this guard must be continuous, for if it is relaxed or abandoned for a time, the enemy obtains a foothold and an advantage from which it is difficult and expensive to dislodge him—much more so than is a steadfast maintenance of the guard.

Business men generally now understand and appreciate these facts. What of the banks—appraisers of assets, dealers in credit?

Unfortunately there is not as yet any uniformity of recognition by banks of the asset values created and maintained by advertising. Francis H. Sisson, Vice-president of the Guaranty Trust Company, in a recent article citing some notable examples of large good-will valuations, says that there are any number of companies whose good-will is acknowledged by the shrewdest bankers in the country as their greatest asset.

Yet there are other bankers, presumably just as shrewd, who either do not

acknowledge this principle or at least do not act upon it. In too many cases they are like the old-fashioned doctor whose first advice, in case of trouble, was to cut out the appendix. They regard the advertising appropriation as an appendix—an interesting but worthless appendage. The first—the obvious—thing to do is to cut it out! Then we will see about the rest of the works!

And yet this advertising is the one thing that has the power to enhance and preserve the value of a manufacturer's product, reputation, and business. It is the best possible barometer that the banker can have of the manufacturer's intentions, principles, and planning ability.

When we say that a man is worth so much money, we mean simply that, if he does not live up to his agreements, we can take away from him this tangible evidence of his ability to keep his promises. But if he has impressed his name and his goods upon the minds of the buying community and thereby acquired a potential source of profits for the future, has he not acquired an asset that is just as valuable?

And yet to-day there are banks turning down loans to progressive business men because they feel that too much is being expended for advertising, or demanding that the advertising appropriation be materially reduced before a loan is granted.

It is time that bank directors should be impressed with the fact that in passing on loans, the best index they can have of the borrower's prospects is an outline of his advertising campaign and a set of the public announcements that he has made concerning himself and his goods.

If an advertiser believes in the asset value of his advertising—and he would be a fool to spend money for it if he did not—he has a definite duty to himself, to his business, and to other advertisers in insisting upon recognition of his advertising as an investment.

And so it is recommended that advertisers undertake this campaign of education by filing outlines of their advertising campaigns with their banks—panticularly country banks—and that every director in these banks be placed or mailing lists to receive copies of each advertisement and piece of follow-up matter.

By educating the directors of our banks to the value of public good-will and esteem, we shall make more easy the task of opening the bank doors to legitimate advertising assets.

THE YOUNG MAN OF TO-DAY.

"A lot of respect is due to the young man of to-day who 'comes through' with his head up, his character four-square, his ambition firm and his vision undimmed.

"Probably one of the greatest problems which ever confronted young men in commencing their active productive lives is the problem they will find in the world to-day.

"It may be stated as this: the younger generation is naturally unformed and will take its mould from the customs and habits, the experience and work, in which it finds itself upon entering the arena of active affairs. 20 years ago the average habits of life, business methods and commercial intercourse were reasonably steady nd awell defined. To-day the younger generation, still unformed, is coming into a world of conditions in a stage of flux more perturbed than the unformed desires of youth and adolescence.

"More important than ever before is it that young men and women to-day have some definite aim, some definite beliefs, a definite determination and the ability to hold to a course and trust.

"Twenty years ago you could sometimes trust to luck and opportunity. To-day we must trust to ourselves. It is harder work. May our young men and women make good."—Paull Hayden, "The Man at the Desk," *New York Commercial.*

PHARMACEUTICAL FORMULAS

PROPOSED FOR "UNOFFICIAL FORMULAS, A. PH. A."

The formulas heretofore published will be found in Volume I, JOURNAL A. PH. A., pp. 169, 366, 505, 637, 760 and 1307; Volume V, pp. 309, 422, 529, 631, 748, 862, 991 (see also p. 1129), 1126, 1265 and 1397; Volume VI, pp. 79, 194, 298, 393, 486, 563, 643, 729 and 823.

For list of committee members and committees see April issue, p. 292. Suggestions for formulas, and comments on those published, are invited. They may be sent to a member of the committee or to Chairman J. Leon Lascoff, 1223 Lexington Ave., New York, N. Y.

698.

ISOTONIC SOLUTIONS.

Contributed by E. C. Austin.

Isotonic Solutions* may be roughly calculated as follows:

Mammalian tissues contain 0.91 percent of sodium chloride. By dividing this figure into the molecular weight (58.46) it is found that an isotonic solution of sodium chloride is one that is approximately one-sixth the strength of its molar solution. Thus a liter of a solution of sodium chloride, containing 58.46 Gm. of NaCl, may be made isotonic with the tissues by diluting it to six liters with distilled water.

Since the osmotic pressure of dilute solutions is proportional to the concentration of the dissolved particles it follows that all molar solutions in this same dilution are isotonic with the tissues.

An isotonic solution of procaine would contain 45.5 Gm. of procaine in each liter, while that of pilocarpine hydrochloride would contain 41 Gm. per liter.

Solutions, provided they are not hypertonic, may be made isotonic by adding sodium chloride. A solution of cocaine hydrochloride, to be isotonic, must contain about 6 percent of the salt (57 Gm. per liter). A 1 percent solution is only one-sixth the necessary strength and requires the addition of 7.5 Gm. NaCl (9.1 ÷ 5/6) per liter.

The anesthesia following the use of the local anesthetics is somewhat intensified if no salt is added due to the greater destruction of the cells, but such action is not desirable. As a matter of fact the cells are badly injured even when conditions are made as favorable as possible.

Solutions need not be made exactly isotonic. However, they should be hypertonic rather than hypotonic for the reason that a cell which has been injured, as happens when it has been brought into contact with a protoplasmic poison such as cocaine, atropine, etc., has a higher osmotic pressure than normally.

Although the foregoing rule for making solutions isotonic, and thereby lessening local disturbance, is based upon the laws of osmosis and is just as applicable to-day as it ever was, it should be mentioned that many physiologists now hold that there is no body cell for which these laws are valid inasmuch as they are not surrounded by semi-permeable membranes, as formerly thought, but by surface-tension films which are chemically identical with the rest of the cell protoplasm; that instead of the amount of water absorbed being dependent upon the pressure exerted from within the cell, it is dependent upon the absorbing value of the various soap-like compounds that are formed by the combination of the protoplasm with the different injected substances. (See Fischer in "Forchheimer's Therapeusis of Internal Diseases.")

699.

SATURATED SOLUTIONS.

BY J. LEON LASCOFF.

A saturated solution is one which contains all of a certain substance that the solvent will hold in solution, at a given temperature. The United States Pharmacopoeia gives the exact or approximate solubility of every salt. The temperature for making saturated solutions of salts is 25° C. (77° F.). The chief reasons for delinquencies in making saturated solutions are the following:

1. Impurity of the salts, especially in case of iodides.
2. Careless methods in preparing the solutions.

*See also JOURNAL A. PH. A., 8, 79, 1919.

3. Incorrect weights and measures.
4. Working at a temperature above or below the official.
5. The use of containers of wrong sizes.

The proper method for making saturated solutions is to weigh both the salt and the water. The more convenient way is to weigh out the amount of the salt required and for a given volume dissolve this in sufficient water to produce that volume. These amounts must be determined by actual experience and experimentation and the results of the author's work are presented.

The ordinary method of dissolving a substance is to reduce the substance to be dissolved to a powder in a mortar, add the water gradually and triturate until the substance is dissolved, and filter the solution or pass it through a pledget of cotton. The following table will prove convenient; the amount given in grammes of the salt, added to sufficient water to make 100 Cc., will produce a saturated solution at 25° C. (77° F.) or, the amount in grammes, of the other column added to sufficient water to make a fluidounce will produce a saturated solution. The statement is clear, the water and salt together produce the volume of saturated solution.

SATURATED SOLUTIONS.

	Grammes.	Sufficient water to make:—	Grains.	Sufficient water to make:—
Potassium Iodide	99.60	100 Cc.	456.00	1 fluidounce
Sodium Iodide	127.50	100 Cc.	584.30	1 fluidounce
Strontium Iodide	114.90	100 Cc.	526.00	1 fluidounce
Potassium Bromide	50.40	100 Cc.	230.00	1 fluidounce
Sodium Bromide	72.09	100 Cc.	329.00	1 fluidounce
Potassium Chlorate	5.69	100 Cc.	26.00	1 fluidounce
Magnesium Sulphate	56.32	100 Cc.	260.00	1 fluidounce

FORMULAS.

No. 700.

FACE POWDER.

Talcum	560.00	Gm.
China Clay, dried	200.00	Gm.
Zinc Oxide	100.00	Gm.
Zinc Stearate	100.00	Gm.
Magnesium Carbonate	40.00	Gm.
Perfume to suit,		
To make	1000.00	Gm.

No. 701.

COMPOUND TALCUM POWDER.

Talcum	885.00	Gm.
Boric Acid	40.00	Gm.
Zinc Stearate	15.00	Gm.
Magnesium Carbonate	60.00	Gm.
To make	1000.00	Gm.

For "Talcum Powders" see also Vol. V, p. 862.

No. 702.

DUSTING POWDER.

Menthol	5.00	Gm.
Thymol	5.00	Gm.
Boric Acid, powdered	200.00	Gm.
Perfume to suit		
Talcum		
To make	1000.00	Gm.

Pass through a No. 80 sieve.

For "Dusting Powders" see also Vol. V, p. 863.

No. 703.

DUSTING AND HEALING POWDER.

Zinc Oxide	356.00	Gm.
Alum, powdered	88.80	Gm.
Boric Acid, powdered	444.40	Gm.
Mild Mercurous Chloride	88.80	Gm.
Liquefied Phenol	22.00	Gm.
To make	1000.00	Gm.

No. 704.

ANTISEPTIC FOOT POWDER.

Boric Acid	75 parts
Zinc Oxide	5 parts
Sterilized Talc	20 parts

Oil of Eucalyptus or Oil of Thyme in desired quantity may be added.

Observe caution in heating, do not bring near fire.

No. 705.

FOOT OINTMENT.

Lead Plaster	120 Gm.
Peanut Oil	20 Gm.
Petrolatum	90 Gm.
Boric Acid	15 Gm.
Tannic Acid	5 Gm.
Oil of Melissa q. s.	

No. 706.

MANGE REMEDY.

Whale Oil	500.0 Cc.
Oil of Tar	60.0 Cc.
Crude Petroleum	30.0 Cc.
Precipitated Sulphur	30.0 Gm.

NATIONAL FORMULARY ADDITIONS AND DELETIONS.

Chairman Wilbur L. Scoville of the National Formulary Committee, under date of August 10th, has mailed out lists of articles which will be dropped from the National Formulary, and of some which will be added. The latter does not include all that will be added, but contains all upon which action has been taken up to the present time. He also sends a list of articles whose deletion has been recommended. Concerning these the committee seeks information. It would like to know whether readers regard any of these of sufficient importance to be retained in the Formulary.

The following articles have been dropped from the National Formulary:—

Acetum Opii, Collodium Iodi, Collodium Iodoformi, Collodium Tiglii, Cordiale Rubi Fructus.

Decoctum Sarsaparillae Compositum.

Elixir Calcii Bromidi, Elixir Calcii Hypophosphitis, Elixir Cinchonae Alkaloidorum et Hypophosphitum, Elixir Cinchonae Alkaloidorum, Ferri et Calcii Lactophosphatis, Elixir Cinchonae Alkaloidorum Ferri et Pepsini, Elixir Ferri Hypophosphitis, Elixir Ferri Lactatis, Elixir Formatum, Elixir Formatum Compositum, Elixir Humuli, Elixir Hypophosphitum, Elixir Hypophosphitum et Ferri, Elixir Lithii Citratis, Elixir Lithii Salicylatis, Elixir Pepsini et Ferri, Elixir Rubi Compositum, Elixir Sodii Hypophosphitum, Elixir Strychninae Valeratis, Elixir Zinci Valeratis.

Emulsum Olei Morrhuae cum Calcii Lactophosphatis, Emulsum Olei Morruhae cum Calcii Phosphatis, Emulsum Olei Morrhuae cum Pruno Virginiana.

Fluidextractum Conii, Fluidextractum Helianthemi, Fluidextractum Paracoto, Fluidextractum Petroselini Radicis, Fluidextractum Verbenae.

Galatinum Chondri, Glyceritum Guaiaci.

Iodoformum Aromatisatum.

Linimentum Ammonii Iodidi, Linimentum Tiglii, Linimentum Tiglii Compositum.

Liquor Alumini Acetico-Tartratis, Liquor Bromi, Liquor Ferri Hypophosphitis, Liquor Ferri Nitratis, Liquor Ferri Oxysulphatis, Liquor Ferri Protochloridi, Liquor Magnesii Sulphatis Effervescens, Liquor Strychninae Acetatis, Liquor Sodii Citro-Tartratis Effervescens, Liquor Zinci et Alumini Compositus, Liquor Zinci et Ferri Compositus.

Magma Ferri Hydroxidi, Mistura Guaiaci, Mistura Olei Picis, Mistura Opii et Sassafras.

Oleatum Aconitinae, Oleatum Cocainae.

Petroxolinum Creosoti, Petroxolinum Iodoformi, Petroxolinum Picis, Petroxolinum Terebinthinae Laricis, Pilulae Antidyspepticae, Pilulae Antimonii Compositae, Pilulae Colocynthidis Compositae, Pilulae Colocynthidis et Hyoscyami, Pilulae Colocynthidis et Podophylli, Pilulae Glycerylis Nitratis, Potassa cum Calce, Pulvis Gambir Compositus, Pulvis Kino et Opii Compositus.

Sal Potassii Bromidi Effervescens, Sal Vichyanum Factitium Effervescens cum Lithio, Soda cum Calce, Sodii Boro-Benzoas, Succus Citri et Pepsini, Syrupus Calcii Hydrochlorophosphatis, Syrupus Cimicifugae Compositus, Syrupus Codeinae, Syrupus Ferri et Mangani Iodidi, Syrupus Ferri Hypophosphitis, Syrupus Ferri Lactophosphatis, Syrupus Ferri Protochloridi, Syrupus Morphinae et Acaciae, Syrupus Sodii Hypophosphitis.

Tinctura Caramellis, Tinctura Ergotae Ammoniata, Tinctura Kino et Opii Composita, Tinctura Paracoto, Tinctura Zedoariae Amara, Trochisci Gambir, Trochisci Menthae Piperitae.

Vinum Aurantii Compositum, Vinum Carnis, Vinum Colchici Seminis, Vinum Ferri, Vinum Ferri Amarum, Vinum Fraxini, Vinum Pepsini, Vinum Picis, Vinum Pruni Virginianae, Vinum Pruni Virginianae Ferratum, Vinum Rhei Compositum.

The wines of antimony, colchicum corm and ipecac are to be replaced by corresponding tinctures, and authority given to dispense these when ordered under the name of wines. Wine of beef and iron will be made into an elixir. Thus the class of wines will be dropped but the important members of it will be replaced in other preparations.

Troches of charcoal, phenolphthalein, quinine tannate, santonin, santonin compound, and sulphur and cream of tartar will be replaced by the corresponding tablets.

The following articles are dropped from Part II, being no longer needed for formulas in Part I:

Absinthium, Antimonium Sulphuratum, Cacao Praeparata, Cascarilla, Fraxinus, Guaiaci Lignum, Gutta Percha (tentative), Helianthemum, Macis, Mangani Sulphas, Menyanthes, Papaver Fructus (tentative), Paracoto,

Petroselinum Radix, Pimpinella (tentative), Rubi Fructus (tentative), Strontii Carbonas, Strychninae Valeras, Succus Citri, Terebinthina Laricis, Verbena, Vinum Xericum.

The following items are under consideration for deletion and information regarding amount of use of these is desired from pharmacists:

Elixir Ferri Phosphatis, Elixir Ferri Pyrophosphatis, Elixir Lithii Bromidi, Elixir Potassii Acetatis, Elixir Potassii Acetatis et Juniperi, Elixir Quininae Valeratis et Strychninae, Extractum Cinchonae, Extractum Jalapae, Extractum Podophylli, Extractum Quassiae.

Fluidextractum Cinchonae Aquosum, Fluidextractum Convallariae Florum.

Infusum Cinchonae, Infusum Pruni Virginianae.

Liquor Ammonii Citratis, Liquor Arsenicalis Clemens, Liquor Ferri Acetatis, Liquor Ferri Oxychloridi, Liquor Guttae Perchae, Liquor Hydrargyri et Potassii Iodidi, Liquor Hydrargyri Nitratis, Liquor Hypophosphitum, Liquor Picis Alkalinus, Liquor Potassae Chlorinatae.

Mistura Adstringens, Mistura Ammonii Chloridi, Mistura Camphorae Acida, Mistura Camphorae Aromatica, Mistura Ferri Composita.

Oleoresina Lupulini.

Pilulae ad Prandium, Pilulae Aloes Hydrargyri et Scammonii Compositae, Pilulae Laxativae Post Partum.

Syrupus Papaveris, Syrupus Rubi Fructus, Syrupus Sanguinariae, Syrupus Sennae Compositus.

Tinctura Pimpinellae.

Vinum Colchici Seminis, Vinum Ferri Amarum.

The following additions have been voted:

Ampuls—a chapter on, with typical formulas.

Collodion of Ichthyol.

Elixir Antiasthmatic, Hare (with appropriate title), Elixir of Beef and Iron (replacing Wine of Beef and Iron), Elixir of Buchu, Juniper and Potassium Acetate, Elixir of Catnep and Fennel, Elixir of Creosote and Terpin Hydrate, Elixir Digestive Compound, Elixir of Five Bromides, Elixir of Guarana and Celery, Elixir of Guarana Compound, Elixir of Hydrastis Compound, Elixir of Hydrangea and Lithia, Elixir of Manaca with Salicylates, Elixir of Saw Palmetto and Sandal Compound, Elixir of Tonga Compound.

Liniment of Calamine, Lotion of Calamine, Lotion of Calamine Compound.

Ointment of Capsicum Compound, Ointment of Ichthyol, Ointment of Mustard Compound.

Petroxolin Ichthyol.

Syrup of Chocolate, Syrup of Thyme Compound.

Tablets—chapter on, and typical formulas.

Troches of Red Gum.

The following elixirs are also under consideration but definite action has not been taken:

Elixir Aletris Compound, Elixir Dioscorea Compound, Elixir Four Chlorides, Elixir Ginseng Compound, Elixir Helonias Compound.

It will be noted that these additions do not include any articles dropped from the United States Pharmacopoeia IX, which will be considered later.

Suggestions for further additions will be welcomed. It is necessary to decide on this list at an early date, and promptness is urged. The address of Chairman Scoville is P. O. Box 488, Detroit, Mich.

CHAULMOOGRA TREE TO BE GROWN IN THIS COUNTRY.

Prof. J. F. Rock, former president of the University of Hawaii and now an agent for the Department of Agriculture, has just returned from an extensive trip through the jungles of Siam, Burma and Assam where he has been studying the problem of foreign seed and plant introduction into the United States. After his arrival he announced that the introduction into this country of the chaulmoogra tree was assured and that a permanent supply of the oil for the treatment of leprosy is certain. One hundred acres of ground have been reserved by the Hawaiian Government for the cultivation of the trees. Prof. Rock also brought back with him several specimens of the "taraktogenos" plant, the seeds of which have been sent to the various experimental stations of the Department of Florida, Maryland and California for germination. Within eight years enough fruit will be borne from these trees to initiate a domestic source of supply of chaulmoogra oil. He declared that the natives of the parts of Asia which he visited had been using the curative properties of the taraktogenos trees for centuries. (See article July JOURNAL A. PH. A., and also in *Weekly News Letter*, U. S. Department of Agriculture, August 3, 1921.)

BIBLIOGRAPHY OF PHARMACEUTICAL RESEARCH

Conducted by H. V. Arny, Reporter on the Progress of Pharmacy, Chairman of the Committee on Research.

On these pages, each month, will be found a list of articles on pharmaceutical research that appear in the pharmaceutical and other scientific journals of the world. Whenever possible, the list appearing a certain month will record articles appearing in American journals of the preceding month and articles appearing in foreign journals will be recorded as quickly as possible after the journals reach the Reporter.

All articles appearing in these lists will be presented in abstract form in the bound volumes of the YEAR BOOK, which will be issued as soon after the end of the year represented as editing and printing conditions permit. Those desiring abstracts immediately can obtain same for a fee of one dollar each by communicating with H. V. Arny, 115 West 68th St., New York, and arrangements can also be made for securing photographic reproduction of entire articles at moderate prices when such are desired.

APPARATUS AND MANIPULATIONS.

Anon
New dose measuring device
Pharm. Zent., 62 (May 5, 1921), 274

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Studies in extraction
Am. J. Pharm., 93 (June 1921), 419

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New melting point apparatus
Z. angew. Chem.; through *Pharm. Ztg.*, 66 (June 8, 1921), 484

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Z. angew. Chem.; through *Pharm. Zent.*, 62 (June 23, 1921), 382

Rosenthaler, L.
Analytical methods of the Swiss Pharmacopoeia
Schweiz. Apoth. Ztg., 59 (June 16, 1921), 317

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Pharm. Zent., 62 (May 5, 1921), 265; 62 (May 12, 1921), 281; and 62 (May 19, 1921), 297

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Rept. Pharm.; through *Pharm. Zent.*, 62 (June 9, 1921), 352

Evers, N., and Caines, C. M.
Assay of formaldehyde in tablets
Chem. & Drug., 94 (June 18, 1921), 833

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Jordan, C. J., and Southerden, F.
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J. Am. Pharm. Assoc., 10 (June 1921), 440

Ugarte, T.
Assay of iodine in iodotannic syrups
Anal. Assoc. Quin-Argentina; through *J. Soc. Chem. Ind.*, 40 (June 30, 1921), 447A

GENERAL BOTANY AND BACTERIOLOGY.

Ciamician, G., and Ravenna, C.
Biological significance of alkaloids in plants
Compt. rend.; through *Pharm. Ztg.*, 66 (June 8, 1921), 483

Franzen, H.
Chemical constituents of green plants
Südd. Apoth. Ztg., through *Pharm. Ztg.*, 66 (June 8, 1921), 483

Holm, T.
Diagnostic elements in drug anatomy
J. Am. Pharm. Assoc., 10 (June 1921), 450

Kraemer, H.
Plant colors
Am. J. Pharm., 93 (June 1921), 414

Lumière, A.
Germination of seeds
L' Avenir med.; through *Schweiz. Apoth. Ztg.*, 59 (June 16, 1921), 323

Pack, D. A.
Germination of seeds
Bot. Gaz.; through *Schweiz. Apoth. Ztg.*, 59

(June 23, 1921), 334
Van Wisselingh
Seed-coats of the Solanaceae
Pharm. Weekbl., 58 (June 4, 1921), 788, and (June 11, 1921), 815

THERAPEUTICS AND NEW REMEDIES.

Hofmann and Taub
Antileprol
Pharm. Zent., 62 (May 5, 1921), 276
Kroll, S.
A cancer nostrum
Apoth. Ztg.; through *Pharm. Zent.*, 62 (June 30, 1921), 397

VEGETABLE AND ANIMAL MATERIA MEDICA.

Adler, F.
Ash content of various drugs
Pharm. Zent., 62 (June 30, 1921), 399
Aschan, O.
New constituents of rosin
Ber.; through *J. Soc. Chem. Ind.*, 40 (June 30, 1921), 439A
Baker, J. A.
Bleached coriander
J. Am. Pharm. Assoc., 10 (June 1921), 453
Barnes, E. R.
Vanilla beans
Drug. Circ., 65 (July 1921), 262
Davies, E. C.
Phosphotungstic assay of colchicum
Chem. & Drug., 94 (June 18, 1921) 850
Deane, H., and Edmonton, W. E.
Ether solubility of scammony resin
Chem. & Drug., 94 (June 18, 1921), 833
Duffour
Crystalline constituents of coniferous resins
Rev. Sci.; through *J. pharm. chim.*, 23 (June 1, 1921), 464
Dupont, G.
Acids of maritime pine resin
Comptes rend.; through *J. Soc. Chem. Ind.*, 40 (June 30, 1921), 439A
Gathercoal, E. N., and Terry, R. E.
The capsicum monograph in U. S. P. IX
J. Am. Pharm. Assoc., 10 (June 1921), 423
Goris and Vischniak
Alkaloids of valerian
Comptes rend.; through *J. Soc. Chem. Ind.*, 40(June 15, 1921), 409A
Heinz
Yeast extract as stomachic and excipient
Therap. Gegenw.; through *Pharm. Ztg.*, 66 (June 11, 1921), 491
Holmes, E. M.
Elder flowers
Pharm. J., 106 (June 4, 1921), 426
Jonsson
Testing storax
Farm. Revy.; through *Pharm. Ztg.*, 62 (June 23, 1921), 383
McCoy, G. W., and Chapin, C. W.
Antiplague vaccine
Pub. Health Rept.; through *Pharm. Era*, 54 (July 1921), 251
Newcomb, E. L., Rogers, C. H., and Folkstad, C. W.
Podophyllum ash standards
Am. J. Pharm., 93 (June 1921), 429
Oesterle, O. H.
Volatile bodies in frangula
Schweiz. Apoth. Ztg., 59 (June 30, 1921), 341
Saaman, K.
Pharmacology of digitalis
Chem. & Drug., 94 (June 18, 1921), 850
Sabalitchka, T.
Constituents of Drosera rotundifolia
Südd. Apoth. Ztg.; through *Pharm. Ztg.*, 66 (June 8, 1921), 484
Siegfried, K.
Hydrocyanic acid content of cherry laurel leaves
Schweiz. Apoth. Ztg., 59 (June 16, 1921), 325
Smyithe, C. E., and Newcomb, E. L.
Ash yield of gentian
J. Am. Pharm. Assoc., 10 (June 1921), 457
Tate, G.
Influence of heat and moisture on ergot and its preparations
Chem. & Drug., 94 (June 18, 1921), 848
Tate, G.
Stability of infundibular extract
Chem. & Drug., 94 (June 18, 1921), 848
Van Itallie, E. I.
Ursone in Viscum album
Pharm. Weekbl., 58 (June 11, 1921), 824
Van Laer, M. H.
Enzymes of malt
J. pharm. chim., 23 (May 16, 1921), 435
Vaughan
Vitex peduncularis as quinine surrogate
Brit. Med. J.; through *Chem. & Drug.*, 94 (June 25, 1921), 903
Willstätter, R., Oppenheimer, T., and Steibelt, W.
Preparation of solution of maltose from yeast
Z. physiol. chem.; through *J. pharm. chim.*, 23 (June 1, 1921), 467
Wong, Y. C.
Constituents of American ginseng root
J. Am. Pharm. Assoc., 10 (June 1921), 431

Yanagasawa, H.
Japanese bird lime
J. Pharm. Soc. Japan., 70 (May 1921), 405

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Evers, N.
Alkaloidal titrations
Chem. & Drug., 94 (June 18, 1921), 834
Graber, H. T.
Enzyme action and hydrogen ion concentration
J. Am. Pharm. Assoc., 10 (June 1921), 417
Korevaar, A.
Chemical affinity
Chem. News, 123 (July 1, 1921), 8
Kubut, O.
Magnesia mixture reagent
Chem. Ztg.; through *Pharm. Era*, 54 (July 1921), 251
Martin, F.
The system, picric acid; sodium thiosulphate
J. pharm. chim., 23 (June 1, 1921), 452
Nivière, J.
Catalytic hydrogenation
Bull. soc. chim.; through *J. Soc. Chem. Ind.*, 40 (June 15, 1921), 409A
Rutherford, E.
Stability of atoms
Chem. News, 123 (July 8, 1921), 25
Sakoschansky, A.
Numerical relationship between calcium and strontium
Chem. News, 123 (July 8, 1921), 20
Sarnagiotto, E.
Chemical action of light
Chem. News, 123 (July 8, 1921), 27
Von Frederichs, O.
Preparation of Nessler's Reagent
Arch. Pharm., 259 (June 15, 1921), 158

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Camescasse and Bisot
Manganese in therapeutics
Bull. Soc. Therap.; through *Pharm. Era*, 54 (July 1921), 251
Corfield, C. E., and Woodward, Elsie
Assay of sodium arsenate
Chem. & Drug., 94 (June 18, 1921), 837
Gallois, P.
Permanganate of silver as urinary antiseptic
J. pharm. chim., 23 (May 16, 1921), 438
Jones, A. J.
Assay of bromides in saline and halogen mixtures
Chem. & Drug., 94 (June 18, 1921), 840
Kockel & Zimmerman
Toxicity of fluorine compounds
Münch. med. Wsch.; through *Pract. Drug.*, 39 (July 1921), 36
Kohn-Abrest
Toxicological assay of arsenic
Ann. chim. analyst; through *Pharm. Zent.*, 62 (June 30, 1921), 396
Kolthoff, I. M.
Argentometric assay of iodides
Pharm. Weekbl., 58 (June 25, 1921), 917
Kolthoff, I. M.
Assay of bases combined with weak acids
Pharm. Weekbl., 58 (June 18, 1921), 885
Kolthoff, I. M.
Iodometric assay of arsenous acid
Pharm. Weekbl., 58 (May 28, 1921), 737
McLachlan, T.
Assay of nitrates in bismuth salts
Chem. & Drug., 94 (June 18, 1921), 841
Millikin, R. A.
The significance of radium
Science, 54 (July 1, 1921), 1
Morris, R. L.
Titration assay of arsenates
Chem. & Drug., 94 (June 18, 1921), 838
Sherk, D. C. L.
Methoxyl determinations of the monarda oils
J. Am. Pharm. Assoc., 10 (June 1921), 417
Staddon, D. R.
Quality of hydrogen dioxide
Am. Drug., 69 (July 1921), 24

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Bennett, C. T., and Windle, F. B.
Assay of theobromine-sodium salicylate
Chem. & Drug., 94 (June 18, 1921), 836
Bennett, C. T.
Liquefied phenol
Chem. & Drug., 94 (June 18, 1921), 836
Bertrand, G., and Compton, A.
A curious modification of emulsin
Bull. soc. chim.; through *J. Soc. Chem. Ind.*, 40 (June 15, 1921), 404A
Blumann, A., and Zeitschel, O.
Verbenene and its derivatives
Ber.; through *J. Soc. Chem. Ind.*, 40 (June 30, 1921), 448A
Chapin, R. M.
Improved Denigès test for methyl alcohol
J. Ind. Eng. Chem., 13 (June 1921), 543
Cofman
Preparation of di-iodosalicylic acid
Gazz. chim. ital.; through *Chem. & Drug.*, 94 (June 25, 1921), 898
Corfield, C. E., and Eastland, C. J.
Assay of hydrocyanic acid
Chem. & Drug., 94 (June 18, 1921), 849

Corfield, C. E., and Boyes, G. R.
Commercial bismuth phenate
Chem. & Drug., 94 (June 18, 1921), 847
Davy, E. D.
Assay of sodium benzoate in oleomargarine
J. Am. Pharm. Assoc., 10 (June 1921), 458
Ducloux, E. H.
Oil from Cynara cardunculus
Anal. Soc. Quim. Argentina; through *J. Soc. Chem. Ind.*, 40 (June 15, 1921), 396T
Emery, W. O.
Assay of salicylates
J. Ind. Eng. Chem., 13 (June 1921), 538
Funcke, Y.
Brodie's melen
Arch. Pharm., 259 (June 15, 1921), 93
Furukawa, S., and Tomizawa, Z.
Volatile oil of Perilla nankinensis
J. Soc. Chem. Ind. Japan; through *J. pharm. chim.*, 23 (May 16, 1921), 426
Gadamer, J., and Knoch, F.
Action of chlorocarbonic acid on certain alkaloids
Arch. Pharm., 259 (June 15, 1921), 135
Gadamer, J., and Hammer, F.
Scopolin
Arch. Pharm., 259 (June 15, 1921), 110
Ganassini, D.
Toxological detection of morphine
Bull. chim. pharm.; through *J. Soc. Chem. Ind.*, 40 (June 30, 1921), 446A
Grayson, E.
Vital vitamines
Am. Drug., 69 (July 1921), 27
Grün, A.
Ethyl esters of the fat acids
Chem. Umschau; through *Pharm. Zent.*, 62 (May 19, 1921), 307
Haehn, H.
Decomposition of tyrosinase
Biochem. Zsch.; through *J. pharm. chim.*, 23 (June 1, 1921), 467
Hérissey, H.
Hydrolysis of methyl d-mannoside by enzymes
J. pharm. chim., 23 (May 16, 1921), 409
Herzog, M.
Nature of enzymes
Am. Drug., 69 (July 1921), 62
Hibma, A. M.
A new albumin reaction
Dtsch. med. Wsch.; through *Pharm. Ztg.*, 66 (June 4, 1921), 471
Huerer, R.
Oil content of Juniperus oxycedrus
J. pharm. chim., 23 (June 1, 1921), 441
Juillet, A.
Oil of cade
Am. Drug., 69 (July 1921), 25
Karrer, P., and Widmer, F.
Constitution of cellobiose
Helv. Chim. Acta; through *J. Soc. Chem. Ind.*, 40 (June 15, 1921), 402A
Kellner, J.
Testing glycerin for purity
Chem. Umschau; through *Pharm. Zent.*, 62 (June 16, 1921), 366
King, H.
Sulphur compounds in commercial salvarsan
Chem. & Drug., 94 (June 11, 1921), 790
Kofler, L.
Cineol from thyme
Pharm. Monatsh.; through *Pharm. Ztg.*, 66 (June 8, 1921), 484
Legrand,
Assay of maltose and lactose
L'Union pharm.; through *Drug. Circ.*, 65 (July 1921), 245
Livingston, A. E.
Toxicity of thymol and carvacrol
J. Pharmacol. Exp. Therap.; through *Am. J. Pharm.*, 93 (June 1921), 447
Lizius, J. L.
Assay of phosphate in glycerophosphates
Chem. & Drug., 94 (June 18, 1921), 841
McKee, R. H., and Strauss, F. A.
Synthesis of benzoic acid from benzene
Chem. Met. Eng.; through *J. Soc. Chem. Ind.*, 40 (June 15, 1921), 410A
McKie, P. V.
Determining the purity of saccharin
J. Soc. Chem. Ind., 40 (June 30, 1921), 151T
Murchauser, H.
Influence of certain chemicals on the rotation of dextrose
Biochem. Zsch.; through *J. pharm. chim.*, 23 (June 1, 1921), 470
Naumann, B., and Schneider, H.
Conversion of acetylene into acetaldehyde
Südd. Apoth. Ztg.; through *Pharm. Zent.*, 62 (June 2, 1921), 336
Ochi, S.
Mechanism of manufacture of chloroform from alcohol
J. Soc. Chem. Ind., Japan; through *J. Soc. Chem. Ind.*, 40 (June 30, 1921), 447A
Perrot, E., and Lecoq, R.
Food and vitamines
Bull. Sci. Pharm.; through *Pharm. J.*, 106 (June 4, 1921), 453
Schneider, W.
Fatty acids from hydrocarbons
Chem. Umschau; through *Pharm. Zent.*, 62

(May 5, 1921), 273
Schrauth, W.
Hexalin and its uses
Seifenfab.; through *J. Soc. Chem. Ind.*, 40 (June 15, 1921), 397A
Schulak, E.
Determination of saponification, iodine and acid bromine number of fats
Pharm. Zent., 62 (June 30, 1921), 391
Shinozaki, Y.
Volatile oil of Juniperus taxifolia
J. Chem. Ind. Japan; 40 (June 15, 1921), 411A
Shinoxaki, Y.
Volatile oil of Vitex trifolia
J. Chem. Ind. Japan; through *J. Soc. Chem. Ind.*, 40 (June 15, 1921), 411A
Simonsen, J. L.
Volatile oil of Skimmia laureloa
J. Soc. Chem. Ind., 40 (June 15, 1921), 127T
Spaeth, E., and Sobel, P.
Synthesis of hordenin
Monatsh.; through *J. pharm. chim.*, 23 (May 16, 1921), 427
Tanret,
Quinic acid in the leaves of Coniferae
Compt. rend.; through *Drug. Circ.*, 65 (July 1921), 261
Tiffeneau, M.
Stability of ouabain
Pharm. Ztg., 66 (June 8, 1921), 483
Tinkham, A. F.
Detecting adulteration in bergamot oil
Bull. Mass. Coll. Pharm.; through *Nat. Drug.*, 51 (July 1921), 353
Ugarte, T.
Caffeine assay
Anal. Soc. Quim Argentina; through *J. Soc. Chem. Ind.*, 40 (June 15, 1921), 408A
Waser, E.
The centenary of quinine
Schweiz. Apoth. Ztg., 59 (June 23, 1921), 330, and 59 (June 30, 1921), 345
Wilson, C. P.
Manufacture of citric acid from lemons
J. Ind. Eng. Chem., 13 (June 1921), 554
Wolff, H.
Manufacture of glycol
Chem. Umschau; through *Pharm. Zent.*, 62 (May 19, 1921), 306
Zelada, M. F.
Oil of Tagetes anisata
Am. Per. J.; through *Chem. & Drug.*, 94 (June 25, 1921), 890

CLINICAL AND DIAGNOSTIC METHODS.

Hedberg, F.
Detection of blood in feces
Farm. Revy.; through *Pharm. Zent.*, 62 (June 2, 1921), 336

MISCELLANEOUS.

Junker
Lead in cosmetics
Pharm. Zent., 62 (May 19, 1921), 271

COUNCIL BUSINESS

A. PH. A. COUNCIL LETTER NO. 22.

(Abstract.)

WASHINGTON, D. C., July 13, 1921.

94. *Personnel of committees to draw up resolutions on the death of Henry P. Hynson and George B. Kauffman:* Henry P. Hynson—E. F. Kelly, Chairman, Baltimore, Md., J. C. Peacock, Philadelphia, and John F. Hancock, Baltimore. George B. Kauffman—J. H. Beal, Chairman, Urbana, Ill., Julius Koch, Pittsburgh, Pa., and Miss Anna M. Bagley, Columbus, Ohio. (Items 81, 84 and 89.)

95. *B. L. Murray of Rahway, N. J., elected chairman of the Committee on Standards for Drugs and Chemical Products (Item 92).*

96. *Applicants Nos. 507 to 535 inclusive, elected.*

97. *Council Business at New Orleans.* At the last meeting of the Council held in Washington, D. C., on May 10, 1920, it was decided that the Secretary should inform the members of the Council of the business to be transacted at the next meeting in advance of the date of holding the meeting in order that the completion of the work might be expedited. The Secretary requests such communications.

98. *The following applications for active membership have been submitted:*

No. 536, Morris L. Rottenberg, 431 Sutter Ave., Brooklyn, N. Y.; No. 537, Ferdinand P. Silber, 3250 Burnet Ave., Cincinnati, Ohio; No. 538, Justin George Zverina, 12210 Miles Ave., Cleveland, Ohio; No. 539, George Belohoubek, 2688 Woodhill Rd., Cleveland, Ohio; No. 540, Donald West Hasbrouck, 1617 Doan Ave., E. Cleveland, Ohio; No. 541, Albert Paul Metzgar, Kenmore Drug Co., Kenmore, Ohio; No. 542, Fred Wilbur Neuman, 632 Greenfield St., S. W., Canton, Ohio; No.

543, Dennis J. Horgan, 58 East Main St., Three Rivers, Mass.; No. 544, John G. Lewis, 34 Holbrook St., Jamaica Plain, Mass.; No. 545, Benjamin G. Burnett, 12 Greenwich Park, Boston, Mass.; No. 546, Gladys B. Miller, 13 Central St., Concord Junction, Mass.; No. 547, Dr. Francisco Hidalgo Larrúa, General Gómez No. 28, Camaguey, Camaguey, Cuba; No. 548, Samuel Ernest Weinberg, 691–23rd Ave., San Francisco, Cal.; No. 549, Sister Marie Collens, 1014 N. Stanton St., El Paso, Texas; No. 550, James F. Bradley, 104 Loomis St., Chicago, Ill.; No. 551, A. F. Wilkerson, Marion, Ala.; No. 552, William Alvin Stenborg, Sacred Heart, Minn.; No. 553, Paul Silvester, 1339 H Street, N. W., Washington, D. C.; No. 554, Cecil J. Moore, 203 Wing Avenue, Butte, Mont.; No. 555, A. Francis Peterson, 816 Hilda Avenue, Missoula, Mont.; No. 556, Miss Dina Froiland, 1138 N. Leavitt St., Chicago, Ill.; No. 557, Lisle Price Frock, Spring Lake Beach, N. J.; No. 558, Willard Ronald Hart, Dunlap, Iowa; No. 559, Mabel Margaret Newquist, Essex, Iowa; No. 560, Raymond Otto Sutter, Burlington, Iowa; No. 561, Lindsay Wesley Butler, Scottsville, Va.; No. 562, Aaron Davidson, 687 E. 93rd St., Cleveland, Ohio; No. 563, J. L. Cameron, Henderson, Texas; No. 564, C. C. Harris, 1019 McGowan St., Houston, Texas; No. 565, Josiah Green Smith, 1019 Proctor St., Port Arthur, Texas; No. 566, H. E. Hielscher, Guam St., Giddings, Texas; No. 567, Leopold Simon, 110 Ave. "C," San Antonio, Texas; No. 568, Josiah William Collins, 419 Polk Street, Amarillo, Texas; No. 569, Stinson Killgore Heard, Merryville, La. A. G. DuMez, *Secretary.*

A. PH. A. COUNCIL LETTER NO. 23

(Abstract.)

WASHINGTON, D. C., July 21, 1921.

99. *Motion No. 98. Applicants Nos. 536 to 569, inclusive, elected to active membership.*

100. *Detroit Branch elects Walter M. Chase, Council Representative,* to succeed Leonard A. Seltzer.

101. *Program for the New Orleans Meeting.* The Committee on Program presents the following tentative program for the sixty-ninth annual meeting to be held in New Orleans, September 5 to 9, 1921:

TENTATIVE PROGRAM FOR SIXTY-NINTH ANNUAL MEETING.

(See July JOURNAL A. PH. A. under Societies and Colleges.)

Hotel Grunewald has been selected as the Headquarters for the Convention.

A. PH. A. COUNCIL LETTER NO. 24.

(Abstract.)

WASHINGTON, D. C., August 5, 1921.

102. *Special items of business to be considered by the Council at the next meeting (Item 97):*

1. A decision as to the desirability of the appointment of non-members of the Council to Council committees.

2. Consideration of the desirability of the A. Ph. A. holding membership in the U. S. Chamber of Commerce.

3. Discussion of the advisability of the appointment of a full-time Secretary-Treasurer.

Under date of July 19, 1921, Prof. Wulling writes from Minneapolis on this subject as follows:

"Referring to item 97, Council Letter 22, let me say in a general way the A. Ph. A. must realize more fully that it, more than any other one agency, is the trustee of the professional aspect of pharmacy and that on the basis of this realization it should become more active and adapt itself more quickly to the growing needs of the present. It should not only administer upon matters as they arise but should foresee, direct, initiate and even demand where necessary. It should more fully embody and represent and carry out aggressively an unmistakably upward spirit and policy of American pharmacy; should recognize more thoroughly its own power and exercise it affirmatively; should definitely seek to establish higher standards of professional conduct and of education; should ever be alert and discriminate in national legislative matters affecting professional practice; in short, should be the watch dog, the stimulator and the conservator of professional pharmacy in a more marked degree than it now is. To do all these things requires a large group of workers under competent leadership and direction such as the regular officers cannot or at least ought not to be expected to give. The A. Ph. A. needs in addition to its regular officers a thoroughly alive and competent general manager adequately housed in a suitable headquarters. Personally I see no serious obstacles to raising a fund of a million

dollars for an Association building in which the many activities which the Association should engage in could be carried out. A modest endowment could also be provided for. Others have done similar things. Why can't we?"

103. *Program for New Orleans Meeting (Item 101).* The Committee on Program presents the following final draft of the program for the sixty-ninth annual meeting. Some changes in the tentative program were necessary on account of the crowded condition of the program for Friday, the last day. One joint session of the N. A. B. P. and the A. C. P. F. was eliminated on the recommendation of Prof. Bradley, Secretary-Treasurer of the A. C. P. F.

104. *Election to Fill Vacancy on Committee on Unofficial Formulas.* Moved by W. B. Day, seconded by DuMez, that Mr. Robert Gerstner be elected a member of the Committee on Unofficial Formulas to fill the vacancy caused by the resignation of R. W. Terry. This action is requested by J. L. Lascoff, Chairman of the Committee.

105. *Election of Active Members.* (There were 569 members elected up to July 1, 1921; those following are credited to 1922.) No. 1, Nathan Morris Faber, 1020 Atchison Place, St. Louis, Mo.; No. 2, M. A. Krupkin, 1521 Fullerton Ave., Chicago, Ill.; No. 3, Stephen B. Kocharski, 2751 N. Western Ave., Chicago, Ill.; No. 4, John E. Hjelte, Lombard, Ill.; No. 5, Anna Zoe Burrier, Forbes & Halkett Sts., Pittsburgh, Pa.; No. 6, Sr. M. Casilda Ruewe, St. Francis Hospital, 45th St., Pittsburgh, Pa.; No. 7, James E. Way, 102 West Main St., Jackson, Mich.; No. 8, William H. Ford, 12th & Lakeside Ave., Lakeside Hospital, Cleveland, Ohio; No. 9, Samuel Virginius Bracy, 120 So. Main St., Little Rock, Ark.; No. 10, Walter E. Manns, 1211–5th Ave., McKeesport, Pa.; No. 11, Lawson J. Cooke, Goodland, Ind.; No. 12, Thos. B. Crigler, Attica, Ind.; No. 13, Mrs. R. Waitzel Lishinsky, 113 E. Poplar St., West Frankfort, Ill.; No. 14, Nathaniel H. Margolis, 3326 E. 119th St., Cleveland, Ohio; No. 15, Zdenek Koller, 3401 W. 26th St., Chicago, Ill., S. & S. membership; No. 16, Mrs. Ocy Crawford Johannes, St. Clair & McKinnon Aves., East Liverpool, Ohio; No. 17, Max Harvitz, 817 Cassatt St., Pittsburgh, Pa.; No. 18, Mrs. Emma K. Wallace, Box 644, New Castle, Pa.; No. 19, Charles Jacob Miller, 12 Oakland Sq., Pittsburgh, Pa.; No. 20, John Rock, 1106 Talbot Ave., Braddock, Pa.; No. 21, Jerome Edward Murphy, 1906 Oakhill Ave., Baltimore, Md.; No. 22, Charles Pinkney Hildebrand, 122 W. 10th St., York, Nebr.; No. 23, James A. Barone, 108 East Madison St., Baltimore, Md.; No. 24, Miss Jane E. Roberts, Iowa State University, Iowa City, Iowa; No. 25, J. B. Ellis, Yazoo City, Miss.; No. 26, W. C. Herbert, Tchula, Miss.; No. 27, William Eugene Pettis, State Insane Hospital, Fondren, Miss.; No. 28, Charles Warren Noyes, 796 Howard Ave., New Haven, Conn.; No. 29, Miguel D. Torres, Military Hospital, Mexico City, Mexico.

A. G. DuMez, *Secretary.*

A. PH. A. COUNCIL LETTER NO. 25.

(Abstract.)

Washington, D. C., August 19, 1921.

To the Members of the Council:

106. *Program for New Orleans Meeting (Items 101 and 103) approved.*

107. *Election of active members, Applications 1 to 29, elected.* Motion No. 105.

With these applications, a new set of numbers was started, the intent being to show that the membership of these applicants, although beginning immediately after their election, would hold over for 1922. It has been pointed out that this might lead to confusion. You are therefore directed to change the numbers (Nos. 1–29) of these applications as given in Council Letter No. 24 to 570–598.

108. *Treasurer Whelpley announces that he will retire from office this year:* Under date of August 3, 1921, Treasurer Whelpley writes Chairman LaWall as follows:

"No doubt, you understand that I expect to retire from the position of treasurer, this year. I am writing now in a formal way, as it occurred to me that I should file this information with you, as chairman of the Council.

"I trust that this year there will be no difficulty in finding some one to take up the work."

A. G. DuMez, *Secretary.*

COMMITTEE REPORTS

REPORT OF THE COMMITTEE ON DRUG MARKET.*

(*Continued from p. 549, July issue.*)

CARAMEL: Of the ten samples examined only four were found to be of N. F. quality. One of the samples was distinctly granular even when spread in a thin layer. As the N. F. requires caramel to be homogeneous it was considered that the granular condition is undesirable, particularly, as it has a tendency to increase with the separation of a thin liquid portion and to occasionally become sour upon keeping. Another sample yielded a precipitate when subjected to the phosphoric acid test, and one had a slight alkaline reaction and taste. Three samples were a little low in specific gravity. Reported by J. G. ROBERTS.

CASCARA SAGRADA: One lot contained considerable *Rhamnus Californicus.* Reported by G. A. SLOTHOWER.

CATECHU: The three lots examined assayed 65.6%, 73.6%, and 74.8% alcohol-soluble matter, respectively. The U. S. P. requires not less than 60%. Reported by F. J. KEENAN.

CINCHONA, YELLOW: One lot was *Cinchona pallida* and not the official *Cinchona calisaya.* It contained only 2.37% alkaloids. Reported by G. A. SLOTHOWER.

COLCHICUM ROOT: Two lots yielded .44% and .58%, respectively, of colchicine. Reported by J. G. ROBERTS.

COLCHICUM SEED: As usual, all of the colchicum seed was of high quality as 0.75% and 0.58% of colchicine was found in two lots. Reported by J. G. ROBERTS.

CRESOL: An excess of hydrocarbon rendered one lot of undesirable quality. Reported by J. G. ROBERTS.

CUDBEAR: Cudbear varies greatly in ash content. The six lots examined yielded 3.34%, 6.18%, 12.14%, 22.9%, 37.4%, and 36.7% ash, respectively. The N. F. maximum limit is 35%. Reported by GEO. E. ÉWE.

ELDER FLOWERS: The difficulty in cleaning such substances as elder flowers is illustrated in one lot which originally yielded 10.04% ash, but which after two attempts at depriving it of earthy matter still yielded 9.46% of ash. The first cleaning reduced the ash yield only 0.2%. Reported by J. G. ROBERTS.

GENTIAN: Several lots were excessively moist and were rejected. Reported by GEO. E. ÉWE.

GLUCOSE: Recent shipments of glucose have been of particularly fine quality, as they had only a slight yellowish color and comply with all the U. S. P. requirements. Reported by J. G. ROBERTS.

GUAIAC: The nine lots examined assayed 95.4%, 85.7%, 76.4%, 75.9%, 70.8%, 74.9%, 95.3%, 91.7% and 83.9% alcohol-soluble matter, respectively. The U. S. P. requires not less than 85%. Reported by GEO. E. ÉWE.

HELLEBORE, WHITE, JAPANESE: Sample contained 2.84% alkaloid which is more than was found in any previous sample. The largest amount heretofore found was 1.75%. Available literature states that the alkaloidal content of hellebore ranges from .4% to 1.5%. Reported by J. G. ROBERTS.

HYDRANGEA: One lot contained an excessive amount of stems. Reported by GEO. E. ÉWE.

HYOSCYAMUS: One bale, of a two-bale consignment, consisted of a mixture of approximately equal parts by weight of Hyoscyamus and Belladonna Leaves. The mixture of the two leaves was not indiscriminate; the belladonna leaves appearing to form the core of the bale. Reported by GEO. E. ÉWE.

IPECAC ROOT: A broker's sample contained only 1.1% ether-soluble alkaloids and yielded 5.8% ash. It was, therefore, 65% low in alkaloid and 1.3% high in ash. Reported by J. G. ROBERTS.

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*Pennsylvania Pharmaceutical Association, Philadelphia, June 1921.

IRON LACTATE: One lot contained only 87.2% crystallized iron lactate. The N. F. standard is 97%. Reported by F. J. KEENAN.

KAMALA: The previous extensive adulteration of kamala with sandy material appears to have been discontinued as we found only 11.7% of ash in the one lot examined. Previous samples have contained as high as 57% sandy material. Quoting from "Squires Companion" to the "British Pharmacopoeia" we find the following ash limits: Austrian and Hungarian 10%; German, Italian, Japanese, Russian, Swedish and Swiss 6%; and Portuguese 8%. Squires also states that pure kamala yields only 1.37% ash. *Service and Regulatory Announcements* No. 19 issued by the U. S. Government permits not more than 8%.

The results obtained with the acid-insoluble ash test proved the presence of foreign matter, as the amount found in pure kamala is negligible, whereas this lot yielded 9%. While it was considered that the ash content of this lot was higher than necessary it may be possible that a better product is not commercially obtainable as since 1911, when we found 2.57%, no sample has yielded less than 21.7% ash. Reported by J. G. ROBERTS.

KINO: The three lots examined assayed 28.6%, 44.6%, and 50.2% alcohol-soluble matter, respectively. The U. S. P. standard is "not less than 45%." Reported by K. SUTO.

KIESELGUHR: Three lots lost, respectively, 15.2%, 12.1%, and 12.4% of their weight upon ignition. Reported by F. GLOOR.

LICORICE EXTRACT, STICKS: A small percentage of the sticks, of a lot of stick extract licorice, contained a core of soft extract surrounded by a brittle coating of extract. Evidently a defect in manufacture and not an intended adulteration. Reported by GEO. E. ÉWE.

LIQUOR FORMALDEHYDE: Deterioration in the quality of this substance was noted as four of the thirteen lots examined were of undesirable quality. Two lots contained considerable paraformaldehyde, which would not remain in solution even at ordinary temperature. One lot was distinctly dirty and another had a yellow color. Reported by J. G. ROBERTS.

LUPULIN: One lot was not acceptable on account of its pronounced valerian-like odor, which the N. F. states renders it unfit for use. Reported by J. G. ROBERTS.

LUPULIN: One lot assayed 44.75% ether-soluble matter and 25.2% ash, respectively, whereas the N. F. requires not less than 60% ether-soluble matter and not more than 16% ash. Reported by F. GLOOR.

MAGNESIUM OXIDE, TECHNICAL: Sample contained 3.98% calcium oxide; was about 11.1% low in strength; contained an excess of carbonate and lost 23% of its weight upon ignition. Reported by J. G. ROBERTS.

MARSHMALLOW ROOT: One lot contained excess periderm and when used in the manufacture of fluidextract a product was obtained which was so much darker than usual as to be unmarketable. Reported by F. GLOOR.

MYRRH: The fourteen lots examined assayed 20.9%, 32.9%, 38.3%, 33.0%, 31.4%, 18.7%, 27.1%, 29.4%, 30.9%, 32.2%, 31.5%, 34.7%, 42.9% and 35.9% alcohol-soluble matter, respectively. The U. S. P. standard is not less than 35%. Reported by F. J. KEENAN.

NUX VOMICA, POWDERED: A 2000-pound lot contained only 2.36% of alkaloids which is 0.14% below the U. S. P. requirement. A frequent cause for the prevalence of low strength nux vomica is due to the fact that it is not powdered sufficiently fine for assay. However, as this lot was received in a finely powdered state it is evident that it did not contain sufficient alkaloids. Reported by J. G. ROBERTS.

OIL OF BIRCH: Three lots that failed to yield positive results when subjected to identity tests were considered of suspicious quality and were, therefore, rejected. Reported by J. G. Roberts.

OIL OF COCOANUT: Complaints have been received regarding both the rancid odor and the lack of odor of this oil. A really rancid odor is of course an indication of inferiority, but samples having little or none of the characteristic odor are found to be of good quality. Reported by J. G. ROBERTS.

OIL OF OLIVE: A broker's sample was rejected because of its high acid number. Reported by J. G. ROBERTS.

OLEORESIN, MALE FERN: A sample, marked as containing 24% to 25% filicin, was found to contain only 17% crude filicin and was therefore rejected. Reported by J. G. ROBERTS.

PAPAN: The seven lots examined assayed 1.25%, 1.27%, 1.7%, 1.25%, 1.26%, 1.12%, 1.14%, respectively, in digestive power. Reported by K. SUTO.

PETROLATUM–LIQUID: All of the twelve samples tested were of satisfactory medicinal quality. One sample was particularly good, as it contained only a mere trace of carbonizable impurities. The viscosity of most of the samples could not be determined by the U. S. P. method, as that method is not applicable to the heavy medicinal oils now on the market. A new method should be given, if the viscosity test is to be retained in the U. S. P.

Reported by J. G. ROBERTS.

PODOPHYLLUM: A lot was divided into roots and rhizomes and found to consist of 29.7% roots and 70.3% rhizomes. The roots were found to contain 13% more resin than the rhizomes, therefore it is likely that a large proportion of root in podophyllum is not objectionable.

Reported by GEO. E. ÉWE.

QUINCE SEED: An examination of one lot showed it to contain about 50% of very dark brown, almost black, seeds. They produced an inferior mucilage, both in color and viscosity. As good quality seeds have a light, reddish brown color this lot was considered of unsuitable quality. Reported by J. G. ROBERTS.

RED GUM, POWDERED: Four lots yielded 2.63%, 73.6%, 81.3%, and 97.1% of water-soluble matter, respectively. The first mentioned lot evidently had been previously extracted.

Reported by F. GLOOR.

RED ROSE LEAVES: Two lots yielded, respectively, 4.12% and 4.59% ash, and, therefore, slightly exceeded the U. S. P. ash limit of 3.5%. Reported by G. A. SLOTHOWER.

RHUBARB, CHINESE: One lot was so recent as to be moist and fleshy.

Reported by G. A. SLOTHOWER.

ROSEMARY LEAVES: One bag, of a large consignment, consisted of red rose leaves.

Reported by G. A. SLOTHOWER.

SARSAPARILLA: Numerous lots of sarsaparilla are offered from which the knotty crowns have not been removed. Reported by F. J. KEENAN.

STYRAX: The following results were obtained in one lot: Ash, 2.82%. Residue insoluble in hot alcohol, 4.79%. Acid number, 85.0. Saponification number, 194.2. Free and combined cinnamic acid, 14.09%.

Sample complies with the U. S. P. requirements, except that it contains 2.29% excess of matter insoluble in hot alcohol, and yields 1.82% excess of ash. Although the U. S. P. does not state the amount of cinnamic acid that should be present in storax, we consider it an important factor and, therefore, determined the amount of free and combined cinnamic acid present according to Umney's method, as published in the November 1912 number of the *Perfumery and Essential Oil Record*. In this method, the storax is first purified and then used for the determination. The amount found to be present in the purified storax is lower than Umney's standard, which we quote as follows:

"Based upon such method we are of opinion that the minimum which we had"—previously—"put of 15% might well be raised to 20%."

Although sample contained less than Umney's revised standard of 20% cinnamic acid, it is the best that we have found on the market. Reported by J. G. ROBERTS.

TEREBENE: One lot yielded 75% distillate below 160° C. The U. S. P. states that terebene boils between 160° C.–172° C. Reported by K. SUTO.

SKUNK CABBAGE: One lot was badly worm-eaten. Reported by GEO. E. ÉWE.

SODIUM CACODYLATE: One lot required 4 Cc. tenth normal potassium hydroxide volumetric solution whereas the U. S. P. states that not more than 0.5 Cc. is necessary.

Reported by GEO. E. ÉWE.

UVA URSI: One lot contained 12.5% of stems. The U. S. P. limit of stems and other foreign matter is not more than 5%. Reported by GEO. E. ÉWE.

VALERIAN: One lot offered as such possessed the odor, taste, and appearance of valerian but was not valerian, as it was inulin-bearing and, probably, belonged to the *Compositae*, whereas valerian is starch-bearing and belongs to the *valerianacea* family. Reported by GEO. A. SLOTHOWER.

WILD LETTUCE: Twenty-five percent of one lot was infected with mold.

Reported by GEO. A. SLOTHOWER.

WORMSEED, RUSSIAN: A six-bag lot was rejected because it contained only a trace of santonin. The "National Standard Dispensatory" states that wormseed should contain 2.5% to 3.5% of santonin, but that the commercial article rarely yields more than 2%. According to an abstract in the PROCEEDINGS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, Vol. 34. p. 413, Flückiger found that the flowered plants, collected in September, contained no santonin. This fact may account for the absence of santonin in this lot. Reported by J. G. ROBERTS.

The following table shows the results of 217 crude drug assays made in the Analytical Laboratory of the H. K. Mulford Co. during the year June 1, 1920 to June 1, 1921:

Drug.	Number of samples.	Lowest assay. %	Highest assay. %	Average. %	Standard.		No. Above.	Standard. Below.
Aconite leaves	3	0.19	0.27	0.23	0.2%	alkaloids	2	1
Aconite root	17	0.21	0.68	0.39	0.5%	alkaloids	3	14
Belladonna leaves	10	0.26	0.75	0.48	0.3%	alkaloids	10	0
Belladonna root	3	0.43	0.62	0.54	0.45%	alkaloids	2	1
Cantharides Chinese	5	0.64	1.75	1.20	0.6%	cantharidin	5	0
Cinchona red	24	1.63	12.01	7.71	5%	alkaloids	22	2
Cinchona yellow	8	5.54	12.32	8.19	5%	alkaloids	8	0
Coca leaves	2	0.49	1.18	0.83	0.5%	alkaloids	1	1
Colchicum Seed	17	0.48	0.81	0.60	0.45%	colchicine	17	0
Conium Seed	3	0.29	0.56	0.39	0.5%	coniine	1	2
Cubebs	1	12.4	12.4	12.4	10%	vol.-ether-ext.	1	0
Gelsemium	1	0.52	0.52	0.52	0.4%	alkaloids	1	0
Ginger, Jamaica	15	2.50	5.22	4.03	2%	non-vol.-ether-ext.	15	0
Guarana	2	4.62	5.57	5.09	4%	caffeine	2	0
Hydrastis	7	2.74	3.97	3.06	2.5%	alkaloids	7	0
Hyoscyamus	11	0.058	0.102	0.077	0.065%	alkaloids	10	1
Ignatia	3	2.53	3.55	3.19	2%	alkaloids	3	0
Ipecac	7	2.00	2.99	2.39	1.75%	alkaloids	7	0
Jalap	13	4.89	32.06	13.41	7 Gm.	total resin	11	2
Kola Nuts	14	1.10	2.37	1.64	1.5%	caffeine	12	2
Lobelia	6	0.37	0.64	0.52	0.5%	alkaloids	3	3
Mandrake	6	3.30	5.95	4.63	3%	resin	6	0
Nux Vomica	13	2.04	2.82	2.51	2.5%	alkaloids	7	6
Physostigma	8	0.13	0.35	0.20	0.15%	alkaloids	6	2
Pilocarpus	1	1.16	1.16	1.16	0.6%	alkaloids	1	0
Quebracho	3	1.06	1.36	1.20	1%	alkaloids	3	0
Sanguinaria	6	3.41	5.21	3.78	2.5%	alkaloids	6	0
Stramonium leaves	7	0.32	0.64	0.50	0.25%	alkaloids	7	0
Veratrum Viride	1	0.99	0.99	0.99	1%	alkaloids	0	1
Totals	217						179	38

COMPARISON WITH REPORTS PREVIOUSLY SUBMITTED.

Year.		Total.	Above.	Below.	Percent above.
1909	Report	395	313	83	79.3
1910	Report	340	291	49	85.6
1911	Report	263	224	39	85.1
1912	Report	298	235	63	78.8
1913	Report	382	264	118	69.1
1914	Report	286	221	65	77.2
1915	Report	133	98	35	73.6
1916	Report	215	156	58	72.9
1917	Report	172	147	25	85.3
1918	Report	131	113	18	86.8
1919	Report	206	173	33	83.9
1920	Report	211	173	38	81.9
1921	Report	217	179	38	82.4

Last year only aconite root and colchicum corm were the drugs one-half or more of which ran below standard. This year aconite root is still in the deficient list, in addition to conium seed, lobelia and veratrum viride. Nux Vomica also deserves an unfavorable rating.

Reported by GEO. E. ÉWE.

(Signed) *Committee:* CHARLES H. LAWALL, CHARLES E. KRAMER, GEORGE E. ÉWE, JOHN G. ROBERTS, *Chairman.*

CORRESPONDENCE

HOSPITAL PHARMACISTS IN THE AMERICAN PHARMACEUTICAL ASSOCIATION.

The Editor, JOURNAL OF THE A. PH. A.

As a Hospital Pharmacist of many years' standing I would trespass upon your valuable space to say a few things about the proposed organization of a group of hospital pharmacists within the Association, the aim of such a group being to interest them in the work of the Association, which in itself is a very important one, as a study of your JOURNAL shows every month, and really it does not seem possible for a hospital pharmacist to keep up to date without its aid, so I would advise every young pharmacist to become a member of the A. Ph. A. and absorb knowledge for future days; also every old pharmacist should at once become a member, so he does not die before doing what he should have done years ago.

Hospital pharmacists are naturally much interested in pharmacy and medicine; they are 100 percent professional men and have no side lines to distract their attention. By the nature of their calling they have to keep well posted and up to date on everything concerning their work, and as the commercial end is immaterial to them, their energies and mind are always bent upon improving and increasing the importance of the pharmacy departments in the hospitals. Their eyes look upwards and they long to accomplish things which, while adding further dignity to their already valuable services, will make them still more helpful to the physicians with whom they are daily in contact in their war upon disease and suffering.

The proposed movement for organizing Hospital Pharmacists is neither offensive nor defensive, but merely a constructive idea of the highest importance, which if successfully carried out will, I firmly believe, have far-reaching results in the future and place our whole profession upon higher and broader planes, also call into our ranks intellects of the highest order. So every pharmacist should take a wholehearted interest in this movement and help make it the success it deserves to be, and I suggest as a starter in the right direction that every member of the A. Ph. A. do some canvassing among his brother pharmacists, especially those practicing in hospitals, and have them send for information about this movement to William B. Day, General Secretary A. Ph. A., Chicago, also ask for a membership blank and send that $5.00, and get where they belong.

(Signed) EDWARD SWALLOW,
Pharmacist, Outpatient Department,
BELLEVUE HOSPITAL, NEW YORK.

AUGUST 11, 1921.

EDITORIAL NOTES

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STAINLESS IODINE OINTMENT.

W. P. McEwen, writing in the January *Australasian Journal of Pharmacy*, states that responsive to call from the medical profession for a stainless iodine ointment, he has devised a formula based upon the absorbent power of oleic acid:

$$C_{17}H_{33}COOH + I_2 = C_{17}H_{33}I_2COOH$$

In round numbers 286 parts by weight of oleic acid will, theoretically, combine with 254 parts by weight of iodine. In making the ointment, oleic acid is taken in excess of the amount required. An ointment containing four percent of iodine can be prepared with ¼ ounce of iodine, 1 ounce of oleic acid and 11 ounces of soft paraffin. The iodine is reduced to a fine powder, the oleic acid added and thoroughly mixed, and gently warmed on a water-bath till combination is effected, stirring well; the soft paraffin is then added, the ointment mixture stirred, and allowed to cool.

PHARMACY IN FINLAND.

The following notations have been prepared from an abstract of the annual report for 1920 of the pharmacies in Finland, printed in the *Chemist and Druggist*, July 23, 1921, p. 50. The report states that there are 343 pharmacies in Finland (population nearly 3½ millions), and lists the owners and employees. The highest number of prescriptions was dispensed in a pharmacy of Viborg, namely 80,622; the personnel is represented by the owner, two fully qualified pharmacists, seven assistants, of which four were women, and three apprentices. Helsingfors, population 187,544, has fourteen pharmacies, in which, during 1920, 568,715 prescriptions were compounded, the highest number for one pharmacy being 75,583, and the lowest 15,582. Finland can lay claim to the pharmacy nearest the North Pole—the one in Enare (latitude 69), in which the owner, working alone, made up 2,165 prescriptions.

Finland has adopted prohibition and the lawful sources of alcohol supply are the pharmacies; the pharmacists have petitioned the government to relieve them of this duty, and that supply depots be established; however, the request has been declined.

CAMPHOR INDUSTRY OF FOOCHOW.

In the course of a report dealing with the camphor industry in his district, the United States Vice-Consul at Foochow states that trees fit to be used for camphor distillation must be at least 20 years old. When a suitable tree is found a crude native distillery is set up at the spot. This consists of a boiler, with an iron base and a wooden top, connected to a distilling vat partially filled with water. The camphor upon being conducted to the vat precipitates on the inner walls, while the non-precipitable portions drop down as oil, which floats upon the water. About 5¼ pounds of camphor and camphor oil, in the proportions of 70 percent camphor and 30 percent camphor oil, can be produced from 240 pounds of chips. The districts where most of this initial distillation is done are Kienning, Yuchi, Yungan, Yenping, Tatien, Shaowu, Shahsien, and Ningte. The crude product is carried by porters to the Min River, or one of its tributaries, and then carried to Foochow by native boat.

The product as it leaves the distillery in the interior consists of "crystals," and camphor oil; the former are ready for marketing but the latter is redistilled, producing about half its weight of an inferior camphor; the deprived oil is used as a base for dyes and paints.

ITALIAN PUMICE INDUSTRY.

The highest grade of pumice known to the trade is of Italian origin. The seat of the industry is the volcanic island of Lipari, one of the group of the Aolian Islands lying off the north coast of Sicily about 40 miles from the Italian mainland. The town of Lipari, with a population of 10,000 inhabitants, is said to be one of the most prosperous communities in Italy, as most of the Italian pumice mines belong to the municipality, and the city collects an export duty in normal times amounting to a total of not less than 300,000 lire annually.

Roughly speaking, pumice is divided into three grades. (1) The crude material as it is taken out of the mine is known as "pumice chips" or "pezzame" and forms about 80 per cent of the total exports to the United States. (2) Italian powdered pumice is a product of the local mills and is handled in bags for the export trade. The bulk of the exports to Great Britain, France, and countries other than the United States is in this form, the United States being the only country where the crude product is imported and converted into pure powdered pumice. (3) Lump pumice. The shipments from Lipari, during 1919, amounted to over 20 thousand tons, and exports are said to be increasing.

THE BRISTLE INDUSTRY OF RUSSIA.

According to a Memorandum prepared by the Russian Division of the United States Bureau of Foreign and Domestic Commerce, the difference between the American and the Russian methods of feeding hogs is as follows:—In America they are fed in pens on corn and other foods, while in Russia they run freely on pastures and fields and around the villages and are fed on domestic food refuse. Owing to the systematic feeding in the pens, the American hogs are ready for slaughtering within a few months, while in Russia it takes several years. Russian bristles grow coarse and long, first, because the pig spends the greater part of his life in fresh air on pastures, and, second, because of the comparatively cold climate, particularly in Siberia, from whence the finest grades of bristles come—the region between the Ural mountains and Lena River.

The preparation of the assorted bristles is mainly in the hands of the Jewish population of the cities, who own small bristle factories, where workers sort, straighten, turn and drag the bristles. The chief centers for the preparation of bristles are the many towns in the northwestern Provinces of Minsk, Vitebsk, Vilna, Kovno, Baltic Provinces, Poland, and the Ukraine. The essentially Jewish character of the Russian bristle industry was the principal cause for the bristle market being held at the Leipzig fairs in Germany, where the Russain Jews had the right to enter without any restrictions. Although Petrograd was in many respects another important center for bristle exportation, the restrictions on Jewish traders entering Petrograd prevented that city from being the principal trading center for bristles. Germany received, in 1913, 4,288,828 pounds, and the amount of the previous year was considerably larger.

PERSONAL AND NEWS ITEMS.

Prof. Dr. Hermann Schelenz, well-known historian of pharmacy, records that the name "erythroxyline" was first given to cocaine, that it was isolated by pharmacist Dr. F. Gaedeke in the laboratory of Franz L. Sonnenschein, a Berlin pharmacist; the former later became owner of the pharmacy in Dömitz. Dr. Schelenz was elected to honorary membership in the American Pharmaceutical Association in 1912.

Prof. Adolph Ziefle, dean of the School of Pharmacy, Oregon Agricultural College, reported to the Oregon Pharmaceutical Association that, "it is the plan of the faculty of the College of Pharmacy to get more publicity for druggists in city and country papers. This work will be done in coöperation with the Department of Journalism at the college, which maintains a regular system for sending news to the press of the state. The work will be along the lines of advising the public regarding the responsibilities of the pharmacist, the kinds of service the pharmacists can render to the public, and something regarding the use and care of certain druggists' sundries, etc. Articles will also be published in the *Oregon Countryman*, a quarterly bulletin issued by students in the School of Agriculture and through other channels."

Bernard C. Ruppe is known as leader in New Mexico pharmacy, and is responsible for the first pharmacy law of that state. Major Ruppe has a ranch home in Tijeras Canon, near Albuquerque.

Dean W. G. Gregory, of the Buffalo College of Pharmacy, expresses the hope that the cornerstone of the chemical laboratory build-

ing, that is to house the pharmacy department of the college and the chemistry course, will be laid next month.

Dr. Armando Garcia, Havana, Cuba, has been instrumental in effecting the organization of a pharmaceutical society which has for an object the furtherance of pharmaceutical education and promotion.

Charles J. Clayton, secretary of the Colorado Pharmaceutical Association, announces that the Association will meet for one brief session on September 19, just before the convening of the National Association of Retail Druggists, in Denver. The thought is of organized effort in supporting the latter meeting.

Edward T. Hahn, of Philadelphia, became a benedict June 11; Mrs. Hahn was formerly Mrs Sara Richards Brooks. Mr. Hahn is well and favorably known for his activities in state association work and in the Philadelphia A. Ph. A. Branch.

George M. Beringer, ex-president of the A. Ph. A., is about to enter manufacturing business on a large scale, in Camden, N. J. The organization is to be known as George M. Beringer, Inc.

Mme. Pierre Curie has put aside her habitual reticence in matters relating to herself and has written an article in a recent issue of *Je Sais Tout* in which she gives a glowing account of the reception in the United States, calling America a "nation of enthusiasts." She states that in her brief inspection of many laboratories she noted above all that the greatest care was taken in developing scientific activity and in perfecting methods.

Dr. O. Schmiedeberg, formerly and for many years professor of pharmacology in the University of Strassburg, died July 13, in Baden Baden, aged eighty-two years. He is perhaps best known to us in connection with his research work on digitalis.

Business was suspended for an hour in Lafayette, Ind., August 15, during the funeral of Dean W. E. Stone. Many visiting educators attended the service as well as state officials. Purdue trustees and faculty members marched in a body to the church as the casket was carried in. The members of the State Board of Education also attended in a body.

The *Zeitschrift des Allgemeinen Oesterreichischen Apotheker-Vereins* has been merged with Dr. Heger's *Pharmazeutische Post*, under the latter name. The former was founded in 1847, the latter in 1868. The former became the official organ of the Society indicated by its name and the latter publication has been under the editorship of Dr. H. Heger since 1882.

David R. Mantell and editorial staff of *Atoms and Molecules*, the journal of the alumni association of Fordham College of Pharmacy, toured by automobile to White Lake, N. Y., where they spent the week ending July 17th. —*The Practical Druggist.*

The *Chemist and Druggist* of August 6 states that the fact the Paris Faculty of Pharmacy now possesses a handsome co'lection of old drug-pots, etc. (presented by M. Fialon some years ago), explains the circular recently issued by M. Bruntz, Dean of the Nancy Faculty of Pharmacy, in favor of a "Museum of the History of Pharmacy" for the capital of French Lorraine. The Dean has, it appears, already collected some 300 objects, and asks further contributions—old books, documents (diplomas, labels, etc.), photographs, drug-pots, weights, measures and scales, glassware, and obsolete drugs and medicaments.

OBITUARY.

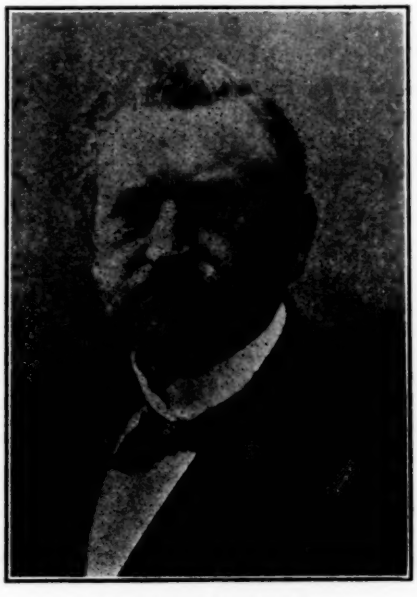
ERNST SCHMIDT.

Honorary Member of the American Pharmaceutical Association since 1899.

One of the best teachers and most successful research workers pharmacy ever had is no more among us. Ernst Schmidt died July 5, of this year. Born on the 13th of July, 1845, at Halle, Germany, he began his career in pharmacy as a boy of sixteen, and from then on spent his entire life in the interests of pharmacy, publishing his first scientific work on the preparation of tannin when twenty-three years of age.

All who knew him, even only from his publications, foremost among them his "Lehrbuch der Pharmaceutischen Chemie," must have admired his wide knowledge and his broad interest in the practical and scientific problems relating to pharmacy. Those who knew him as a teacher will likely never cease to be grate-

ful to this man for the stimulus derived from the lectures, laboratory courses, personal contact, and example. Those who could call him friend—and there were uncounted numbers—found him not so much a man of affectionate words, but surely of kindly deeds, eager to assist with his advice, influence, and wealth. A detailed account of the fruitful work of this "Past Master of Pharmaceutical Research" will be given at a later date.



DR. ERNST SCHMIDT.

This picture was taken in 1909, incident to Professor Schmidt's 25th anniversary as head of the Pharmaceutical-Chemical Institute, University of Marburg.

GEORGE G. MUTH.

George G. Muth, a member of the wholesale drug firm of Muth Bros. & Co., 15 South Charles street, Baltimore, died on the morning of August 5 after a lingering illness at his home 308 North Carey street. He was a son of the late John P. Muth, one of three brothers who founded the business about thirty-six years ago, and took a position there after he had finished his education, in course of time becoming a partner. He took an active interest in social and political affairs, being the first president of the Baltimore Rotary Club, and he also held membership in the Maryland Pharmaceutical Association. For years he attended practically all of the annual meetings of the pharmaceutical associations of the eastern states, also going to some of the sessions of national bodies. He was widely known in the trade and had a host of friends. He is survived by his widow and three children; also by three brothers and two sisters.—*Oil, Paint and Drug Reporter*, August 15, 1921. Mr. Muth joined the American Pharmaceutical Association in 1906.

MRS. WILBER J. TEETERS.

We are advised of the death of Mrs. Wilber J. Teeters, wife of the Dean of Iowa College of Pharmacy, who is also President of the American Conference of Pharmaceutical Faculties. Members of the Association sympathize with him in his bereavement.

SOCIETIES AND COLLEGES.

THE NEW ORLEANS MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

The American Conference of Pharmaceutical Faculties and National Association of Boards of Pharmacy will hold their annual meetings, beginning September 5, in the Grunewald Hotel. The Louisiana Pharmaceutical Association will also convene on Monday, September 5, and conclude its sessions on that day so the members may participate in the meetings of the American Pharmaceutical Association. The reception will be held in the banquet hall of the Grunewald, Tuesday, September 6. His Excellency, John M. Parker, Governor of Louisiana, will welcome the visitors on behalf of the state, and Hon. Andrew J. McShane, Mayor of New Orleans, will speak for the city; the pharmacists will be represented by Local Secretary George W. McDuff and Hon. M. Bernstein of Shreveport, La.

NATIONAL ASSOCIATION OF RETAIL DRUGGISTS.

Plans for the annual meeting of the National Association of Retail Druggists in Denver are nearing completion. The Albany Hotel has been selected as headquarters for the meeting which will open September 19. The annual meeting of the Colorado State Associa-

tion will be a brief business session just prior to the convening of the N. A. R. D. There is considerable interest displayed in the exhibition and the attendance promises to be large. Special tourist railroad rates will be in effect to Denver from all eastern points, and for those who may wish to go on to the Pacific Coast or Yellowstone Park, routing can be had via Denver without extra cost.

THE NATIONAL WHOLESALE DRUGGISTS' ASSOCIATION.

F. C. Groover, Chairman of the Board of Control N. W. D. A., in his call to the members to attend the annual meeting in Atlantic City, September 26–29, says:—"I am sure that you realize the problems that are before our association; and you realize that the quicker we get together and the quicker we solve the readjustment problems, the better off we will be.

"In every readjustment period problems come up that demand the attention of every member of the association. The problems before us this year are greater than ever before in the history of our association. We should come prepared to stay until we have solved these problems to the best interest of the retailer, the wholesaler, the manufacturer, as well as our friend, the consumer."

The entertainment features will be on a scale possible only in Atlantic City, and speakers of prominence on questions of the day have been provided for.

SEVENTH NATIONAL EXPOSITION OF CHEMICAL INDUSTRIES.

Original plans have so far matured it can be safely said that the coming National Exposition of Chemical Industries—the Seventh—which will be held in the Eighth Coast Artillery Armory, New York City, September 12 to 17, will be the biggest chemical event in the history of the country. With more than 400 exhibits displayed on one floor, the vast spectacle will take on the aspect of a world's fair, and will give at one glance an idea of the growth of an industry that only seven years ago was hardly considered a factor in the big business of the United States.

The Society of Chemical Industry will hold its annual meeting in Montreal, August 26 to 31.

The American Chemical Society and Society of Chemical Industry will convene in New York City, September 6 to 10.

The program for the different days of the exposition has been practically completed. There will be an informal opening on Monday, September 12, at 2 P. M., while the formal opening, at which Charles H. Herty, chairman of the advisory committee of the exposition, will make an address of welcome, will take place at 8 P. M.

OFFICERS OF STATE PHARMACEUTICAL ASSOCIATION 1921–1922.

(*Continued from p. 486, June issue.*)

Secretaries of associations are asked to make corrections and send in list of officers, and name of next convention city.

MONTANA.

President, Fred R. Woehner, Great Falls.
First Vice-President, J. N. Starbuck, Valier.
Second Vice-President, Miss Adeline Walters, Sheridan.
Third Vice-President, Bert Johnson, Glendive.
Secretary, J. A. Reidel, Boulder.
Treasurer, J. N. Talbot.

Great Falls was chosen as the meeting-place for next year.

NEW HAMPSHIRE.

President, J. R. Kelley, Newport.
First Vice-President, A. O. Bourque, Nashua.
Second Vice-President, Waldo Babson, Berlin.
Secretary, Percy Calligan, Manchester.
Treasurer, John H. Marshall, Manchester.

NORTH CAROLINA.

President, I. W. Rose, Rocky Mount.
First Vice-President, J. A. Goode, Asheville.
Second Vice-President, P. A. Lee, Dunn.
Third Vice-President, J. P. Stowe, Charlotte.
Secretary-Treasurer, J. G. Beard, Chapel Hill.

Winston-Salem was chosen as the meeting-place for next year.

OHIO.

President, Herbert M. Highfield, Zanesville.
First Vice-President, Harry G. Schmuelling, Cincinnati.
Second Vice-President, W. L. Whelton, Akron.
Treasurer, L. W. Funk, Columbus.
Secretary, Theodore D. Wetterstroem, Columbus.

OREGON.

President, C. J. Kem, Cottage Grove.
First Vice-President, G. C. Sabin, Grants Pass.

Third Vice-President, A. C. Koeppen, Pendleton.

Secretary, A. W. Allen, Portland.

Treasurer, George Tabler, Portland.

SOUTH CAROLINA.

President, S. C. Hodges, Greenville.

First Vice-President, T. P. Young, Greenwood.

Second Vice-President, R. M. Dacus, Greenville.

Secretary-Treasurer, Frank M. Smith, Charleston.

Next year's meeting will be held at Florence.

THE PHARMACIST AND THE LAW.

"SEARCH AND SEIZURE."

All prohibition enforcement draws its authority from the Eighteenth Amendment; the hitch in Congress, at the time of this writing, August 20th, on the prohibition measures is the result of discussion of a much earlier Amendment, the Fourth, which says:

The right of the people to be secure in their persons, houses, papers and effects against unreasonable searches and seizures shall not be violated, and no warrants shall issue but upon probable cause, supported by oath or affirmation, and particularly describing the place to be searched and the persons or things to be seized.

Both of the amendments, that by Stanley in the Senate and Volstead in the House, throw the specific protection of the law around the individual's dwelling place. The saloon was the objective of the prohibition attack in the popular mind, and its partial obliteration is the element of strength which the prohibition law possesses to-day.

ILLINOIS MEDICAL PRACTICE ACT OF 1917 DECLARED VOID.

Directly, pharmacists are not interested in the decision which makes invalid the Illinois Medical Practice Act of 1917, but it clearly points out the care necessary in the construction of legislation so that there will be no discrimination which will render the law invalid.

Section 5 of the law which caused the trouble provides as follows: The applicant for a license to practice medicine and surgery must be a graduate of a medical school deemed to be reputable and in good standing at the time of graduation. The applicant for a license to practice any system or method of treating human ailments without the use of drugs or medicine and without operative surgery must be a graduate of a professional school requiring a four years' course of instruction for graduation.

The Court holds that Section 5 of the Statute in question is void because it "unlawfully and unjustly discriminates against one class of physicians, or those desiring to become physicians, by requiring that before they can practice treating human ailments without the use of drugs, medicine, or operative surgery, they must be graduates of a professional school, college or institution teaching that system which requires as a prerequisite for graduation a 'four years' course of instruction,' while for one who desires to practice medicine and surgery in all their branches the only professional education required is that prior to July 1, 1922, he be 'a graduate of a medical college deemed to be reputable and in good standing at the time of his graduation, and has completed a course of study in such college' in accordance with the law and the rules of the state board of health established and in force at the time of his graduation. . . . We are not prepared to hold that requiring four years' professional education before a chiropractor or osteopath is allowed to practice his profession is unreasonable or unjust. Such a question is a question for the legislature, and the legislature is presumed to have investigated the question for itself in ascertaining what is best for the good of the profession and for the people among whom such profession is practiced; but the legislature cannot discriminate against chiropractors or osteopaths as to the time of professional education required, where no reason can be perceived for such discrimination. The act itself discloses clearly that there is an unjust discrimination against chiropractors and osteopaths. . . . Surely there is no reason for providing that the limited professional education of one class of physicians shall be greater or for a longer time than that for those practicing medicine and surgery in all their branches."

The *Journal A. M. A.* comments:—"This decision, which nullifies the Illinois Medical Practice Act of 1917, clearly demonstrates two facts: First, that the only interest of the state or of the courts in the regulation of the practice of medicine arises from their interest in it as a business. It is not the function of the legislature or the court to decide scientific questions.

The relative merits of different systems of treatment cannot be determined by legislative vote or court decision. The sole interest of the state in such laws lies in its interest in the regulation of the practice of medicine as a business; consequently, all discussions of medical practice acts or state examining boards as a means for elevating the standard of the practice of medicine are beside the point. Second, in any laws regulating or licensing those who treat the sick, the qualifications and conditions for license must be the same, or at least must not be greater for those asking for a limited license than it is for those asking for an unlimited license. In the majority of cases it is far better to provide that the state board or department of registration shall establish such regulations and qualifications as it may deem advisable, instead of specifying these qualifications in the law. If the regulations are unfair they can be criticized and condemned by the court without jeopardizing the entire practice act. The court also held that the regulations of the state board requiring chiropractors to submit letters of endorsement from two physicians or osteopaths was unjust and unreasonable."

BOOK NOTICES AND REVIEWS.

Organic Medicinal Chemicals (Synthetic and Natural). By M. Barrowcliff, M. B. C. F. I. C., and Francis H. Carr, C. B. E., F. I. C. Published by Van Nostrand Co., New York, N. Y., 1920. Pp. XIII + 331. Price, $4.00.

Upon reading the "general preface" of the book written by Dr. Samuel Rideal, one learns that it is one of a series of handbooks being written, more for reference use than as texts, both for chemists, advanced students, and teachers as well as for men of affairs having no special chemico-technical knowledge. It is also to serve as a guide to the standard literature of the particular subject by directing the seeker to the proper source of information with the aid of the bibliographical references given.

The book is divided into sections instead of chapters. Section I. Narcotics and General Anaesthetics. II. Naturally Occurring Alkaloids and Their Derivatives. III. Natural and Synthetic Local Anaesthetics. IV. Antipyretics and Analgesics. V. Organic Antiseptics and Disinfectants. VI. Purgatives. VII. Vaso-Constrictors and Vaso-Dilators. VIII. Diuretics and Uric Acid Solvents. IX. Organo-Metallic Compounds. X. The Digitalis Group, Skin Irritants, Glucosides and Neutral Principles. XI. Other Substances of Interest.

Twenty-four illustrations of apparatus used in the manufacture, or extraction of medical chemicals are found in the book. The scheme of treatment usually followed is English name, synonyms, chemical name, formula (usually graphic), molecular weight, method or methods of manufacture (often quite detailed), description of apparatus (at times of the entire plant with illustrations), quantities of raw materials needed, yield, purification uses, properties, tests, numbers of patents pertaining to the manufacture or discovery, history and bibliographical references.

Seven pages are devoted to *ether*, six to *chloroform*, both with illustrations. Methods are given for the manufacture of the latter from alcohol, acetone, chloroform, and chloral, as well as the electrolytic method.

Under *veronal* thirty-seven patents, mostly German, relating to its manufacture are briefly described or mentioned.

Graphic formulas and equations representing chemical reactions are many and excellent. The latter may also be said of the index and the general book-work.

All in all, this book should prove a ready reference book and great timesaver for the pharmacist, chemist, teacher, student, lawyer and layman seeking information concerning the organic chemicals of the modern materia medica.

JEANNOT HOSTMANN.

NEW PUBLICATIONS.

Introduction to Qualitative Chemical Analysis. By Th. Wilhelm Fresenius. 17th Ed. of the original work by G. Remigius Fresenius. Translated by C. Ainsworth Mitchell. 954 pp. Price, cloth, $8.00. John Wiley & Sons, Inc., New York.

Inorganic Chemistry for Schools and Colleges. By Jas. Lewis Howe. 2nd edition, revised. 3d edition of "Inorganic Chemistry According to the Periodic Law." By F. P. Venable and J. L. Howe, 443 pp. Price, $4.00. The Chemical Publishing Company, Easton, Pa.

Organic Chemistry for the Laboratory. By W. A. Noyes. 4th edition, revised. 293 pp. Illustrated. Price, $3.50. The Chemical Publishing Company, Easton, Pa.